



*Flora of the  
Darwin  
Region*

*Vol 2*

Royal Botanic Gardens  
and National Herbarium

- 8 JUN 1995

LIBRARY

C. R. Dunlop, G. J. Leach  
& I. D. Cowie







# FLORA OF THE DARWIN REGION

Clyde R Dunlop, Gregory J Leach and Ian D Cowie

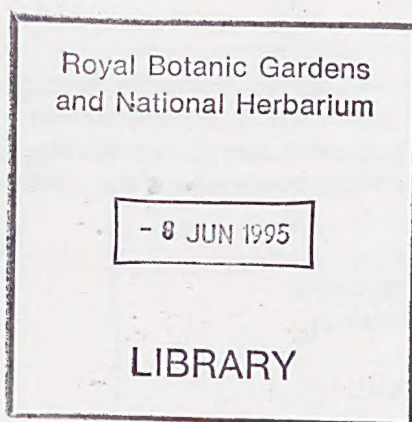
Northern Territory Herbarium  
Conservation Commission of the Northern Territory  
Palmerston, NT  
Australia 0830

## Illustrators

Milton Andrews  
Monika Osterkamp Madsen  
Bee Fong Gunn

## Typesetter

Darryl Heatherley



NORTHERN TERRITORY BOTANICAL BULLETIN No. 20

CONSERVATION COMMISSION OF THE NORTHERN TERRITORY

DARWIN, 1995



Cover: *Decaisnina signata* (F.Muell. ex Benth.) Tieghem  
Painting by Bee Fong Gunn.

581.994295

FLO

copy 1

---

National Library of Australia  
Cataloguing-in-publication entry:

Dunlop, C.R.(Clyde Robert).  
Flora of the Darwin Region

Bibliography  
Includes index:  
ISBN 0 7245 2891 1.

1. Botany - Northern Territory - Darwin Region.
2. Plants - Identification. I. Leach, Gregory J.  
II. Cowie, I.D. III. Conservation Commission of the Northern  
Territory. IV. Title. (Series : Northern Territory  
botanical bulletin ; no. 20).

581.994295

---

This book is copyright. Apart from any fair dealing for the purpose  
of private study, research, criticism or review, as permitted under the  
Copyright Act, no part of this publication may be reproduced by any  
process whatsoever without the written permission of the publisher.

© Conservation Commission  
of the Northern Territory  
PO Box 496  
Palmerston NT 0831  
AUSTRALIA

Publisher: Conservation Commission  
of the Northern Territory  
PO Box 496  
Palmerston NT 0831  
AUSTRALIA

ISSN: 0314-1810

Government Printer of the Northern Territory



## CONTENTS

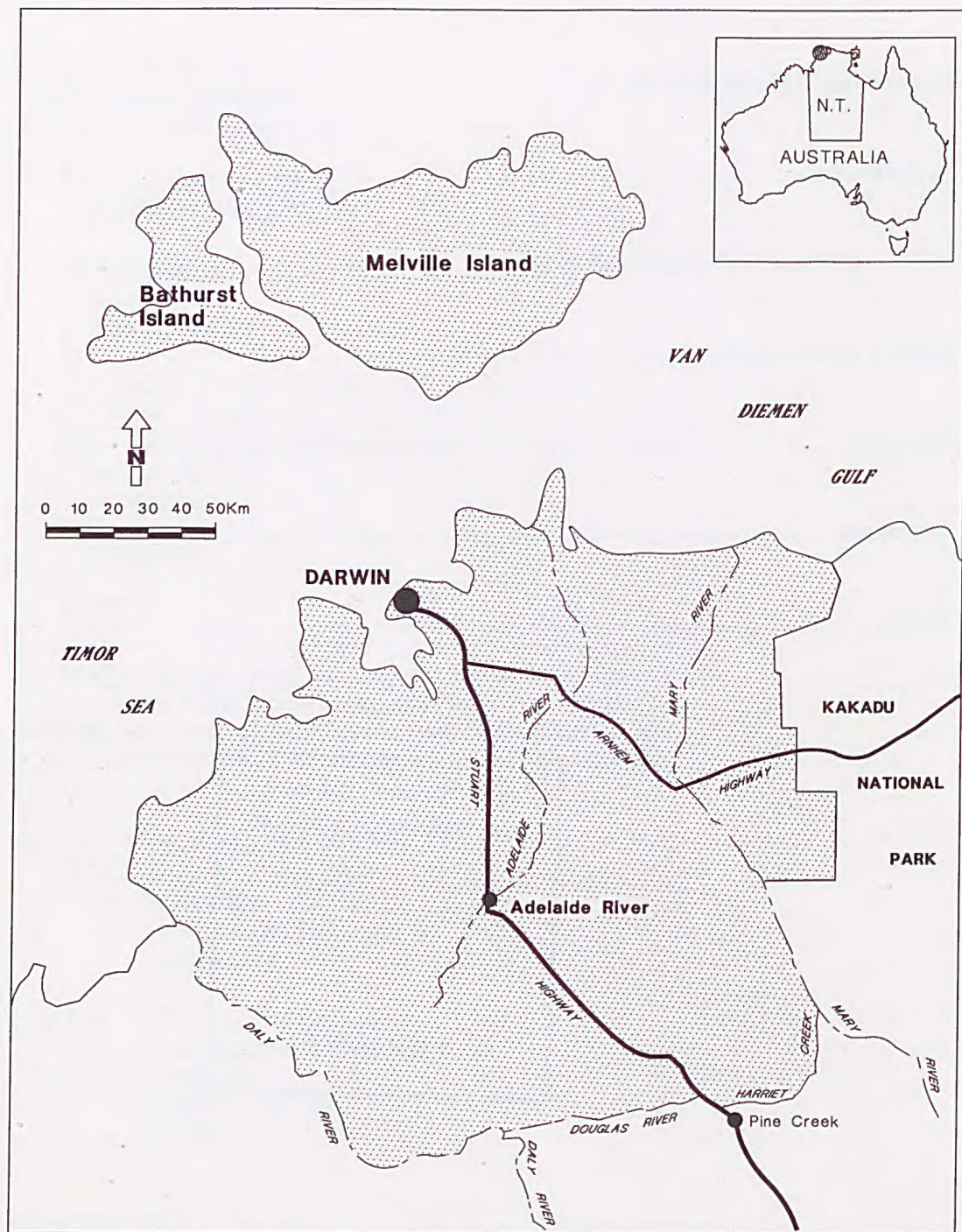
|                                                        |            |
|--------------------------------------------------------|------------|
| <b>Map of the Darwin Region .....</b>                  | <b>iv</b>  |
| <b>Introduction .....</b>                              | <b>v</b>   |
| <b>Abbreviations, contractions &amp; symbols .....</b> | <b>vi</b>  |
| <b>Family descriptions .....</b>                       | <b>1</b>   |
| <b>Glossary .....</b>                                  | <b>238</b> |
| <b>References .....</b>                                | <b>247</b> |
| <b>Index .....</b>                                     | <b>254</b> |

Royal Botanic Gardens  
and National Herbarium

- 8 JUN 1995

LIBRARY





Region covered by this Flora

## INTRODUCTION

This volume, with 440 species, is the first of a projected four volumes documenting the ferns, gymnosperms and flowering plants of the Darwin Region. In preparation for this Flora, a checklist for the Region with approximately 1500 species (Cousins, 1989) and a key to Northern Territory flowering plant families (Clifford & Cowie, 1992) were published. The sequence of families of flowering plants in the Flora follows that of the Cronquist classification (Cronquist, 1981). Introductory chapters on botanical exploration and history of the Region, vegetation, land forms and climate will head volume one along with the ferns and conifers and the flowering plant families from Annonaceae to Surianaceae. Volume three, Rhamnaceae to Asteraceae and four, Alismataceae to Orchidaceae, will complete the series.

Species descriptions were prepared, except where otherwise acknowledged, from specimens in the Northern Territory Herbarium, Darwin. In general the descriptions cover the entire range of variation represented in the collections which for some species may extend across the continent or into the arid zone. A number of species from outside the Region have been included: those whose inclusion would complete the account for the genus for the entire Northern Territory, e.g. *Desmodium*, and those which are known from just outside the boundaries and which logically form part of the regional flora, e.g. *Christia*. A number of native species from outside the region which are commonly cultivated in Darwin are also included.

The authors record their gratitude to the following contributing authors: Bruce Thomson, formerly of the Northern Territory Herbarium, Alice Springs (*Euphorbia*); Glenn Wightman of the Northern Territory Herbarium, Darwin (*Rhizophoraceae*); Peter Wilson and Ross Rowe of the New South Wales National Herbarium, Sydney (*Indigofera*); Jeremy Bruhl of the University of New England, Armidale (*Margaritaria*) and Paul Forster of the Queensland Herbarium, Brisbane for nomenclatural advice in *Drypetes*, *Antidesma* and *Briedelia*. Our illustrators gave generously of their time; their patience and talent are gratefully acknowledged. Their contributions are as follows: Milton Andrews: Plates 2, 4, 5, 7, 9-12, 47, 49-53, 54 p.p., 58 p.p., 60-64, 68-78; Monika Osterkamp Madsen: 1, 3, 6, 8, 13-33, 34 p.p., 35-46, 48, 54 p.p., 58 p.p., 60-64, 68-80; Bee Fong Gunn: 65-67, cover. Monika Madsen additionally conscientiously proofread all the plates. The authors also record their appreciation of the industry and skill of Darryl Heatherly who typeset the volume and took an active interest in its production.

C. R. Dunlop

G. J. Leach

I. D. Cowie     March 1995



## ABBREVIATIONS, CONTRACTIONS & SYMBOLS

|             |                                                                      |
|-------------|----------------------------------------------------------------------|
| ±           | more or less equal to                                                |
| <           | less or fewer than                                                   |
| >           | greater or more than                                                 |
| Aff.        | affinity: closely related                                            |
| c.          | circa: about, approximately                                          |
| Ck          | Creek                                                                |
| diam.       | diameter                                                             |
| DR          | Darwin Region                                                        |
| Dry         | Dry season (roughly April to November inclusive)                     |
| E           | East                                                                 |
| excl.       | excluding                                                            |
| Gulf        | Gulf of Carpentaria                                                  |
| incl.       | including                                                            |
| Kimberley   | The region of northern Western Australia north of 19° S.             |
| L/B         | Length (of leaf blade) over breadth                                  |
| L.S.        | longitudinal section                                                 |
| m           | metres                                                               |
| mm          | millimetres                                                          |
| N           | North                                                                |
| NSW         | New South Wales                                                      |
| NT          | Northern Territory                                                   |
| orth. var.  | orthographic variant                                                 |
| pers. comm. | personal communication                                               |
| q.v.        | quod vide: which see                                                 |
| Qld         | Queensland                                                           |
| R.          | river                                                                |
| S           | South                                                                |
| s.l.        | sensu lato: in the broad sense                                       |
| s.str.      | sensu stricto: in the narrow sense                                   |
| SA          | South Australia                                                      |
| subsp.      | subspecies                                                           |
| T.S.        | transverse section                                                   |
| Top End     | northern NT - loosely defined but here used for area north of 15° S. |
| var.        | variety                                                              |
| VRD         | Victoria River District                                              |
| W           | West                                                                 |
| WA          | Western Australia                                                    |
| Wet         | Wet season (roughly December to March inclusive)                     |

## MIMOSACEAE

Trees, shrubs, lianes or rarely herbs, often prickly or spiny. Leaves alternate, whorled or rarely opposite, 1-pinnate, bipinnate, modified into phyllodes or absent, commonly with a swollen, basal pulvinus. Stipules mostly present, sometimes developed into prickles or spines. Flowers in spikes, racemes, heads or compound inflorescences. Calyx of (3)5(6) sepals, free or united, sometimes reduced or absent. Corolla of (3)5(6) petals, free or joined below to form a tube. Stamens 4-10 or numerous, free or connate below, commonly coloured and long exserted. Carpels 1 or rarely several and free. Fruit a legume, usually dry and dehiscent along both sutures, sometimes indehiscent or breaking transversely into 1-seeded joints. Seeds often with an elongate funicle or funicular aril.

About 60 genera and 3000 species worldwide. Widespread in tropical and subtropical regions, especially in arid or semi-arid climates. About 17 genera in Australia; represented in the NT by 11 genera, 9 of which occur in the DR. [Verdcourt, 1979; Nielsen, 1992]

|     |                                                                               |                    |
|-----|-------------------------------------------------------------------------------|--------------------|
| 1.  | Leaves reduced to simple entire phyllodes .....                               | <b>Acacia</b>      |
| 1.  | Leaves bipinnate .....                                                        | <b>2</b>           |
| 2.  | Woody liane .....                                                             | <b>Entada</b>      |
| 2.  | Herbs, shrubs or trees .....                                                  | <b>3</b>           |
| 3.  | Leaflets >7 mm wide .....                                                     | <b>4</b>           |
| 3.  | Leaflets <7 mm wide .....                                                     | <b>6</b>           |
| 4.  | Leaflets alternate .....                                                      | <b>Adenanthera</b> |
| 4.  | Leaflets opposite .....                                                       | <b>5</b>           |
| 5.  | Pods thin, dehiscent, pale brown; leaflets dull, pale to mid green .....      | <b>Albizia</b>     |
| 5.  | Pods woody, indehiscent, black; leaflets shiny, dark green .....              | <b>Cathormion</b>  |
| 6.  | Flowers pink to purple; fruit breaking into 1-seeded articles .....           | <b>Mimosa</b>      |
| 6.  | Flowers yellow to white; fruit a dehiscent pod .....                          | <b>7</b>           |
| 7.  | Leaves sensitive; sprawling to erect shrubs to 2 m high .....                 | <b>8</b>           |
| 7.  | Leaves not sensitive; shrubs to trees >2 m high .....                         | <b>9</b>           |
| 8.  | Pods >6 mm wide; <9 seeds per pod .....                                       | <b>Neptunia</b>    |
| 8.  | Pods <5 mm wide; >8 seeds per pod .....                                       | <b>Desmanthus</b>  |
| 9.  | Inflorescence a spike .....                                                   | <b>Acacia</b>      |
| 9.  | Inflorescence a globular head .....                                           | <b>10</b>          |
| 10. | Pods with thin valves, 14-21-seeded; seeds <8 mm long, without funicles ..... | <b>Leucaena</b>    |
| 10. | Pods woody, mostly <14-seeded; seeds >9 mm long, with funicles .....          | <b>Acacia</b>      |

## ACACIA Mill.

Trees or shrubs, sometimes spiny. Leaves bipinnate, modified into phyllodes or rarely absent; glands often present. Flowers hermaphrodite or male and hermaphrodite in spicate or globular heads. Calyx usually 4-5-lobed. Corolla 4-5-lobed. Stamens numerous, mostly free. Pods variable, flat to cylindrical, straight, curved, coiled or twisted, dehiscent or indehiscent. Seeds typically with a well developed aril.

A large genus of c. 1200 species in the tropics and subtropics of both hemispheres. About 147 described species in the NT with many more undescribed taxa. About 30 species in the DR. The genus produces



numerous useful products including timber, tannin, perfume, food and animal fodder. [New, 1984; Pinyopusarek, 1990; House & Harwood, 1992]. Numerous species have also been recorded with a variety of ethnobotanical uses, including food, timber, fish poisons and medicine [Miller *et al.*, 1993; Smith *et al.*, 1993].

In a genus as large as *Acacia* it is not unexpected that one would find a great deal of morphological diversity and differences in opinion concerning the classification of the group. The following notes are intended as a brief introduction to the extensive literature available on *Acacia*. The morphological characters important in using the keys are:

**Stipules.** In a few species the stipules are modified into spines and therefore present as a pair subtending each leaf. However, many of the north Australian taxa that produce stipular spines do so only in the juvenile growth stage and spines are not consistently found on the adult plants. In most species of *Acacia* the stipules are minute and often falling early.

**Leaves.** The most characteristic feature of the majority of Australian Acacias is the production of a modified leaf known as a phyllode (Fig. 1). Typically the phyllode is an expanded and flattened petiole. Other species of *Acacia* have bipinnate leaves (Fig. 1). Seedlings of all species in the genus initially have compound leaves and in most groups the first leaves are once-pinnate. A developmental sequence from seedling to adult foliage can be found at the earliest growth stages or on reversion shoots. The phyllodes can also be highly reduced. Arrangement of the phyllodes is typically alternate but fasciculate, whorled or rarely distichous arrangements are found.

**Venation.** The venation pattern is a highly useful character in identification. Phyllodes may have a single longitudinal nerve and in broader phyllodes be markedly penniveined (Fig. 1) or have several to numerous longitudinal nerves. For these plurinerved species the presence or absence of anastomosing veins is important.

**Glands.** Extrafloral nectaries ("glands") occur on both true leaves and phyllodes. The function of these glands in the Australian species is not well understood, although interactions with ants has been suggested (New, 1984). However, the number, form and position of these glands is of some taxonomic value.

**Inflorescence.** Although the individual flowers are of limited value in identification, the arrangement of the flowers in the inflorescence has been attributed considerable significance. The flowers of most species are arranged in either cylindrical spikes or globular heads, although there are some species which show an intermediate state of slightly elongated or "obloid" heads. The inflorescences themselves can be arranged singly or in pairs in the axils or grouped into racemes which may be variously compound.

**Pods.** The pods show a great diversity and although often diagnostic for identification are often ignored by collectors. The shape, texture, surface features, dehiscence mechanism and orientation of seeds in the pod are important features.

### Classification

*Acacia*, as traditionally recognised, is now generally accepted to comprise at least 2 or possibly 3 groups. The ranking of these groups has been the subject of some controversy with major implications for Australia. If *Acacia* is split into a number of genera then the species that remain in *Acacia* are mostly non-Australian. The predominantly Australian phyllodinous species would be placed in another genus. Such a classification was that of Pedley (1986) in which the majority of Australian species were placed in *Racosperma* (DC.) C. Martius. This classification has not been widely accepted, partly due to the magnitude of the change but also partly due to uncertainties in the number of generic groups to be recognised, appropriate ranking of the groups and the nomenclatural validity of some of the available generic names. For detailed discussion of the arguments for and against splitting of *Acacia* see Pedley (1986, 1989) and Maslin (1989).

For the purposes of this treatment and to enable some discussion of the subgeneric groups an earlier classification by Pedley (1978) is followed. This classification divides *Acacia* into the following 3 subgenera:

Subgenus *Acacia* - Trees with stipular spines and bipinnate foliage. Best represented and known as the flat-topped trees of Africa. Poorly represented in Australia but with a number of species in the Top End. In the DR are *A. catechu* var. *sundra*, *A. farnesiana*, *A. pachyphloia*, *A. pallidifolia* and *A. 'Douglas River'*.

Subgenus *Aculeiferum* - Prickly woody vines and small trees which are widespread in the tropics. There is only 1 species in Australia, a woody vine found on Cape York.



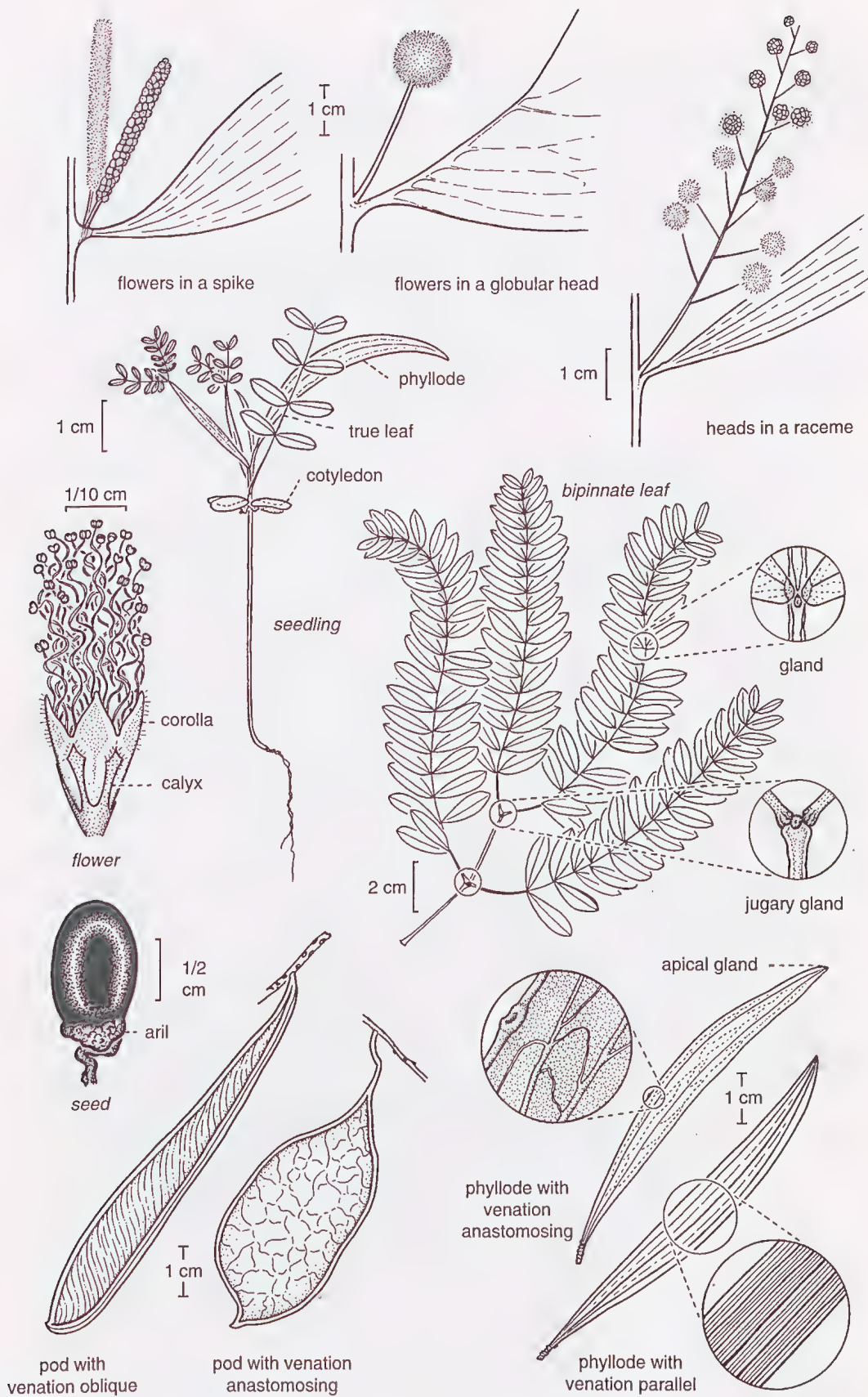


Fig. 1



Subgenus *Phyllodineae* - Shrubs or trees, mostly lacking thorns or prickles and with leaves modified into phyllodes. There are 2 groups (Sections Botrycephalae and Pulchellae) which have bipinnate foliage but on other characters they are considered to be more closely related to the phyllodinous species and so are placed in this subgenus. The majority of Australian species are in this subgenus. Pedley subdivided this subgenus into 7 Sections but only 3 are represented in the DR.

Sect. *Juliflorae* - Phyllodes usually broad and plurinerved. Flowers arranged in spikes. About half the species occurring naturally in the DR belong in this section. viz. *A. aulacocarpa*, *A. auriculiformis*, *A. conspersa*, *A. difficilis*, *A. dimidiata*, *A. gonocarpa*, *A. helicophylla*, *A. holosericea*, *A. humifusa*, *A. leptocarpa*, *A. oligoneura*, *A. oncinocarpa*, *A. pellita*, *A. plectocarpa*, *A. praetermissa*, *A. torulosa* and *A. umbellata*.

Sect. *Phyllodineae* - Phyllodes mostly flat with 1 prominent longitudinal nerve. Flowers in globular heads. The only representative in the DR is *A. alleniana*.

Sect. *Plurinerves* - Phyllodes flat or occasionally terete, longitudinally nerved. Flowers arranged in heads. A well represented group in the DR with *A. hemignosta*, *A. latescens*, *A. mimula*, *A. multisiliqua*, *A. nuperrima*, *A. platycarpa*, *A. praelongata* and *A. tolmerensis*.

|     |                                                                                                                                    |                        |
|-----|------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1.  | Mature plants bearing phyllodes. Pinnate and bipinnate leaves found only on seedlings or on "reversion" shoots on old plants ..... | 2                      |
| 1.  | Plants with bipinnate leaves only, never with phyllodes .....                                                                      | 36                     |
| 2.  | Flowers in globular heads .....                                                                                                    | 24                     |
| 2.  | Flowers in spikes .....                                                                                                            | 3                      |
| 3.  | Phyllodes spirally twisted .....                                                                                                   | <i>A. helicophylla</i> |
| 3.  | Phyllodes flat or terete .....                                                                                                     | 4                      |
| 4.  | Phyllodes with major, often yellowish, veins running together at the base near or with the lower margin .....                      | 5                      |
| 4.  | Not as above .....                                                                                                                 | 9                      |
| 5.  | Pods coiled; phyllodes not dimidiate .....                                                                                         | 6                      |
| 5.  | Pods $\pm$ straight; phyllodes dimidiate .....                                                                                     | 8                      |
| 6.  | Longitudinal nerves on phyllode confluent basally but free from marginal nerve; apical gland absent .....                          | <i>A. mangium</i>      |
| 6.  | Longitudinal nerves on phyllode basally confluent with lower marginal nerve; apical gland mostly present .....                     | 7                      |
| 7.  | Mature pods glabrous; basal gland circular or oval, not conspicuously raised .....                                                 | <i>A. holosericea</i>  |
| 7.  | Mature pods pubescent; basal gland circular, raised .....                                                                          | <i>A. pellita</i>      |
| 8.  | Erect trees or shrubs; corolla glabrous .....                                                                                      | <i>A. dimidiata</i>    |
| 8.  | Sprawling shrubs; corolla with long hairs .....                                                                                    | <i>A. humifusa</i>     |
| 9.  | Phyllodes <2.5 mm wide .....                                                                                                       | <i>A. gonocarpa</i>    |
| 9.  | Phyllodes >2.5 mm wide .....                                                                                                       | 10                     |
| 10. | Phyllodes with parallel longitudinal nerves, not anastomosing, or only occasionally so, sometimes obs cure .....                   | 11                     |
| 10. | Phyllodes with consistently anastomosing nerves (check with hand lens!) .....                                                      | 21                     |
| 11. | Phyllodes with single major vein .....                                                                                             | 12                     |
| 11. | Phyllodes with several prominent major veins or veins obscure .....                                                                | 14                     |
| 12. | Branchlets densely pubescent .....                                                                                                 | <i>A. conspersa</i>    |
| 12. | Branchlets glabrous .....                                                                                                          | 13                     |
| 13. | Spikes pale yellow to white; pods quadrangular, 50-90 mm long, broadest towards apex and tapering gradually to base .....          | <i>A. gonocarpa</i>    |

|                                                                                                                                                                                                                        |                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 13. Spikes deep yellow to golden; pods terete, 85-200 mm long, constricted between seeds .....                                                                                                                         | <b>A. torulosa</b>       |
| 14. Phyllode typically >12 times as long as wide, rarely as low as 9 .....                                                                                                                                             | <b>15</b>                |
| 14. Phyllode <12 times as long as wide and mostly <6 .....                                                                                                                                                             | <b>17</b>                |
| 15. Pods broadest towards apex, opening elastically from apex .....                                                                                                                                                    | <b>A. oncinocarpa</b>    |
| 15. Pods otherwise .....                                                                                                                                                                                               | <b>16</b>                |
| 16. Pods terete, longitudinally wrinkled, constricted between seeds, to 7 mm wide .....                                                                                                                                | <b>A. torulosa</b>       |
| 16. Pods with parallel sides, undulate, resinous, 6-12 mm wide .....                                                                                                                                                   | <b>A. plectocarpa</b>    |
| 17. Phyllodes elliptic with obtuse apex .....                                                                                                                                                                          | <b>18</b>                |
| 17. Phyllodes markedly falcate or dimidiate, mostly with acute apices .....                                                                                                                                            | <b>19</b>                |
| 18. Pods flattened, broadest towards apex, opening elastically from apex .....                                                                                                                                         | <b>A. oncinocarpa</b>    |
| 18. Pods cylindrical, opening otherwise .....                                                                                                                                                                          | <b>A. umbellata</b>      |
| 19. Pod prominently obliquely transversely veined, 1-2 cm wide; seeds oblique to transverse in pod .....                                                                                                               | <b>A. aulacocarpa</b>    |
| 19. Not as above .....                                                                                                                                                                                                 | <b>20</b>                |
| 20. Phyllodes dimidiate or falcate-dimidiate, 2.6-7.6 times as long as wide, secondary veins not anastomosing; spikes densely flowered; pods cylindrical .....                                                         | <b>A. difficilis</b>     |
| 20. Phyllodes narrowly elliptic, curved or falcate, (4.5)7.2-17.2 times as long as wide, secondary veins sparsely or loosely anastomosing; spikes with flowers interrupted; pods flattened and raised over seeds ..... | <b>A. leptocarpa</b>     |
| 21. Trees; flower spikes >55 mm long; pods coiled, opening along length .....                                                                                                                                          | <b>A. auriculiformis</b> |
| 21. Shrubs; flower spikes <45 mm long; pods not coiled. ....                                                                                                                                                           | <b>22</b>                |
| 22. Phyllodes <50 mm long, <5 times as long as wide. ....                                                                                                                                                              | <b>A. mountfordiae</b>   |
| 22. Phyllodes >100 mm long, >5 times as long as wide. ....                                                                                                                                                             | <b>23</b>                |
| 23. Phyllodes >12 mm wide; mucro short and knob-like; calyx lobes glabrous .....                                                                                                                                       | <b>A. oligoneura</b>     |
| 23. Phyllodes mostly <12 mm wide; mucro slender, c. 1.5 mm long; calyx lobes ciliate .....                                                                                                                             | <b>A. praetermissa</b>   |
| 24. Phyllodes quadrangular in section, <1 mm wide .....                                                                                                                                                                | <b>A. alleniana</b>      |
| 24. Phyllodes terete or flat, mostly >1 mm wide .....                                                                                                                                                                  | <b>25</b>                |
| 25. Phyllodes flat, uninerved, sometimes with secondary longitudinal nerve developed .....                                                                                                                             | <b>A. praelongata</b>    |
| 25. Phyllodes plurinerved, terete or flat .....                                                                                                                                                                        | <b>26</b>                |
| 26. Phyllodes >20 mm wide .....                                                                                                                                                                                        | <b>32</b>                |
| 26. Phyllodes <20 mm wide .....                                                                                                                                                                                        | <b>27</b>                |
| 27. Phyllodes <25 mm long .....                                                                                                                                                                                        | <b>A. nuperrima</b>      |
| 27. Phyllodes mostly >30 mm long .....                                                                                                                                                                                 | <b>28</b>                |
| 28. Phyllodes with 1 or more principal longitudinal nerves basally confluent with lower margin .....                                                                                                                   | <b>A. platycarpa</b>     |
| 28. Nerves all separate to base of phyllode or if confluent then never with lower margin .....                                                                                                                         | <b>29</b>                |
| 29. Two prominently raised major longitudinal nerves .....                                                                                                                                                             | <b>30</b>                |
| 29. Major longitudinal nerves >2 or obscure .....                                                                                                                                                                      | <b>31</b>                |
| 30. Phyllode apex acute; inflorescence axis to 30 mm long; pods <20 mm wide .....                                                                                                                                      | <b>A. latescens</b>      |
| 30. Phyllode apex obtuse; inflorescence axis longer than 65 mm; pods >20 mm wide .....                                                                                                                                 | <b>A. mimula</b>         |
| 31. Phyllodes usually with rounded obtuse apices; flower heads in racemes .....                                                                                                                                        | <b>A. hemignosta</b>     |
| 31. Phyllodes with acute apices, usually with prominent mucro; flower heads solitary or in pairs .....                                                                                                                 | <b>A. multisiliqua</b>   |



|     |                                                                                                                                                         |                        |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 32. | Phyllodes with two or more principal longitudinal nerves confluent near base .....                                                                      | 34                     |
| 32. | Nerves all separate to base of phyllode .....                                                                                                           | 33                     |
| 33. | Glands on phyllode 1, near base; flower heads yellow; pods 9-14 mm wide;<br>seeds longitudinal in pod, <7 mm long .....                                 | <i>A. hemignosta</i>   |
| 33. | Glands on phyllode 4-5, scattered along dorsal margin; flower heads cream to white;<br>pods 20-28 mm wide; seeds transverse in pod, c. 10 mm long ..... | <i>A. mimula</i>       |
| 34. | Branchlets prominently flattened, not pruinose .....                                                                                                    | <i>A. tolmerensis</i>  |
| 34. | Branchlets terete, pruinose .....                                                                                                                       | 35                     |
| 35. | Phyllodes >68 mm wide, 1.5-2.3 times as long as wide; flower heads yellow;<br>pod margin thickened but not winged .....                                 | <i>A. dunnii</i>       |
| 35. | Phyllodes <68 mm wide, 2.5-5.2 times as long as wide; flower heads white to cream;<br>pod margin with wing 1.5-3 mm broad .....                         | <i>A. platycarpa</i>   |
| 36. | Leaves with >8 pairs of pinnae .....                                                                                                                    | 38                     |
| 36. | Leaves with <5 pairs of pinnae .....                                                                                                                    | 37                     |
| 37. | Small tree; leaf pinnae >75 mm long .....                                                                                                               | <i>A. pachyphloia</i>  |
| 37. | Shrub; leaf pinnae <40 mm long .....                                                                                                                    | <i>A. farnesiana</i>   |
| 38. | Flowers in spikes .....                                                                                                                                 | <i>A. catechu</i>      |
| 38. | Flowers in heads .....                                                                                                                                  | 39                     |
| 39. | Leaflets <3 mm long .....                                                                                                                               | <i>A. 'Douglas R.'</i> |
| 39. | Leaflets >5 mm long .....                                                                                                                               | <i>A. pallidifolia</i> |

#### *A. alleniana* Maiden

Erect *shrub* or rarely a small tree, 2-4 m high. Bark smooth. *Branchlets* pendulous, terete, glabrous. Stipules caducous. Pulvinus 1.5 mm long, glabrous. *Phyllodes* straight, linear, quadrangular, 120-200 mm long, 0.6-1 mm wide, L/W 150-200, punctulate and/or slightly tuberculate, flaccid, glabrous, veins obscure, apex pungent or subulate, mucro oblique or hooked. Glands inconspicuous or absent. *Inflorescences* on simple axillary peduncles. *Heads* globular, yellow, 4-5 mm wide; peduncle 5-14 mm long, glabrous. *Pods* stipitate, brown, linear to oblong, straight, raised over seeds alternately on each side, 40-140 mm long, 4-5 mm wide, coriaceous, smooth, glabrous, nerves obscure or absent, margin thickened slightly, acute. *Seeds* longitudinal in pod, brown, flattened oblong, 5-6 mm long, 2.5 mm wide. *Flowering*: Feb - April; fruiting: Mar - Oct. Fig. 2

In the NT north of 20° S but within the DR restricted to southern parts on sandstone and on Melville Island.

#### *A. aulacocarpa* Cunn. ex Benth.

Erect long-lived *tree*, 3-10 m high, slightly mealy or hoary due to whitish vernicose covering. Bark grey, fissured. *Branchlets* terete, glabrous. Stipules persistent, brown, triangular, 0.5 mm long, glabrous. Pulvinus 2-6 mm long, glabrous. *Phyllodes* curved or falcate, dimidiate or elliptic, 55-185 mm long,

9-35 mm wide, L/W 3.4-9, glabrous, primary veins obscure, secondary veins parallel and closely spaced, not anastomosing, base attenuate, apex acute, mucro hooked. Glands 1, at pulvinus. *Inflorescences* on simple axillary peduncles, 1-4 per axil. *Spikes* yellow, 18-40 mm long, 3-3.5 mm wide, densely flowered; peduncle 2-6 mm long, glabrous. *Pods* stipitate, brown, linear to oblong, twisted or rarely straight, flat, 21-90 mm long, 14-21 mm wide, woody, mealy or hoary with dried resin, glabrous, more or less transversely reticulately nerved, apiculate and asymmetric. *Seeds* oblique in pod, brown, flattened oblong, 5-6 mm long, 3-3.5 mm wide. *Flowering*: Feb - June; fruiting: Aug - Nov. Fig. 2

Distributed coastally from the Kimberley to Cape York and northern NSW and also in New Guinea. Widespread in DR in woodland or open forest, often on skeletal soils.

#### *A. auriculiformis* Cunn. ex Benth.

Erect *tree*, 6-20 m high. Bark dark grey, fissured. *Branchlets* angular, glabrous. Stipules persistent, reddish, triangular, 1 mm long, glabrous. Pulvinus 3-5 mm long, glabrous. *Phyllodes* curved or falcate, lanceolate to elliptic to oblanceolate, 95-220 mm long, 12-37(52) mm wide, L/W 4-12, glabrous, primary veins 3, secondary veins parallel and widely spaced, sparsely or loosely anastomosing, base attenuate, apex acute. Glands prominent, 1, at

Acacia

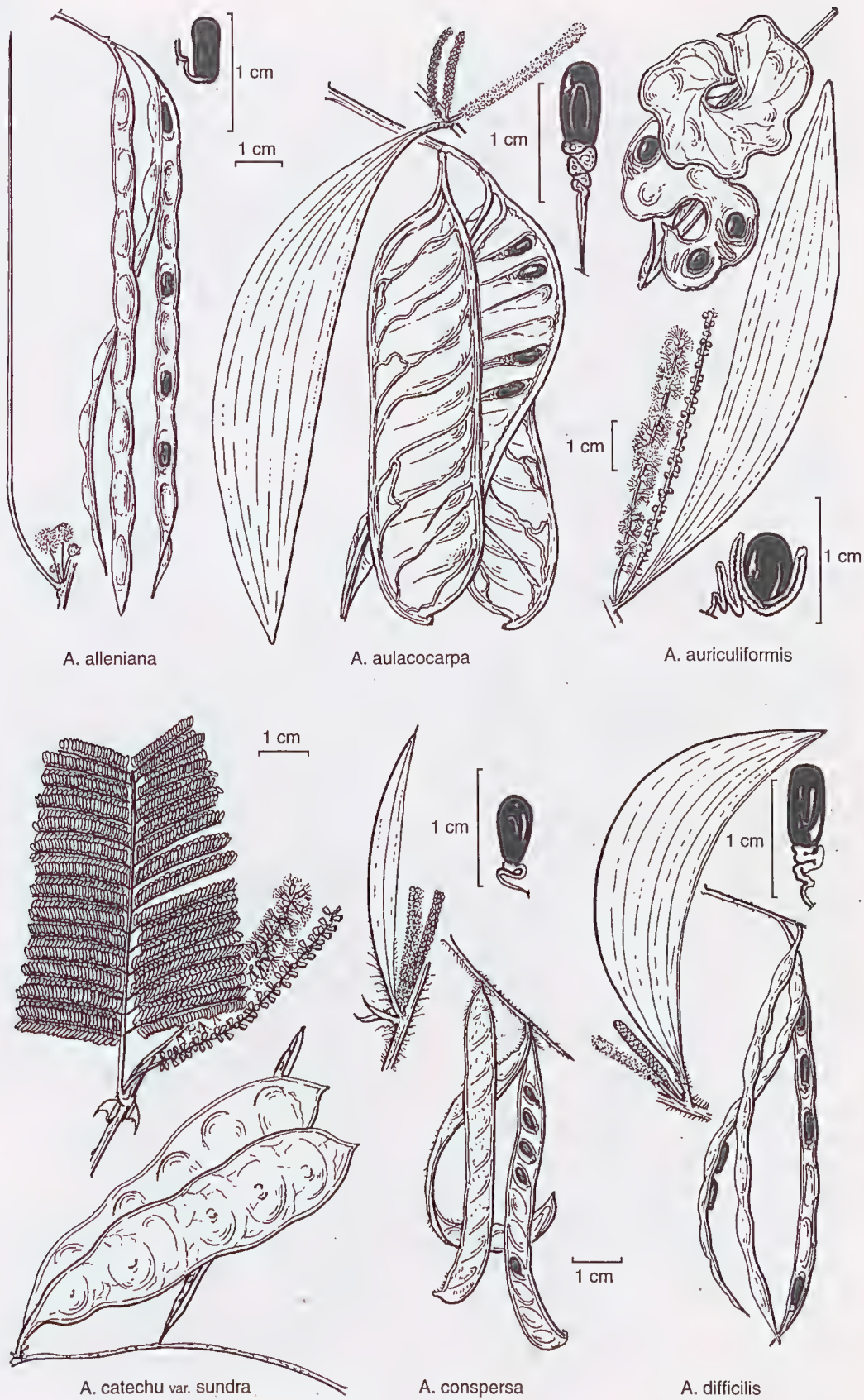


Fig. 2



pulvinus. *Inflorescences* on simple axillary peduncles, 1-4 per axil. *Spikes* yellow, 55-75 mm long, 4-6 mm wide, with flowers interrupted; peduncle 4-7 mm long, glabrous, rachis glabrous. *Pods* stipitate, brown, linear to oblong, coiled, flat but strongly undulate, 65-130 mm long, 10-18 mm wide, woody, glaucous, glabrous, obliquely reticulately nerved, acute. *Seeds* oblique in pod, brown, discoid, 4-5 mm long. *Flowering*: Feb - July; fruiting: July - Oct. Fig. 2

**Black Wattle**

From northern NT to Cape York and New Guinea and common in the DR. Found in and along margins of monsoon forests, margins of swamps and coastal dunes; also widely planted.

**\*A. catechu (L.f.) Willd. var. *sundra* (Roxb.) Kurz**

Erect *shrub* or tree, 4-5 m high. Bark light brown, fissured. *Branchlets* terete or slightly angular with paired, slightly recurved thorns at nodes, glabrous. Stipules persistent, narrow-triangular, 1 mm long, glabrous. *Leaves* bipinnate. Pulvinus 4-5 mm long, glabrous. Leaf rachis 49-150 mm long, 15-21 pairs of pinnae per leaf, hairy on upper surface, jugary glands present on last 2 pairs of pinnae, interjugary glands absent; pinnae 20-42 mm long, 31-43 pairs of leaflets per pinna; *leaflets* linear-oblong, flat, 3-5 mm long, 0.9-1 mm wide, L/W 4-5, lower surface slightly paler than the upper surface, glabrous. *Inflorescences* on simple axillary peduncles. *Spikes* pale yellow, 50-130 mm long, 10 mm wide, flowers interrupted; peduncle 10-18 mm long, glabrous, rachis glabrous. *Pods* stipitate, brown, linear to oblong, straight, raised over seeds alternately on each side, 30-70 mm long, 12-18 mm wide, chartaceous, glabrous, transversely reticulately nerved, apiculate. *Seeds* transverse in pod. *Flowering*: Feb; fruiting: immature pods collected in April. Fig. 2

Native to Sri Lanka, Burma and India. In the DR restricted to an introduction in the Darwin Botanic Gardens and Bullocky Point.

**A. conspersa F.Muell.**

Erect *shrub* or spindly tree, 2-7.5 m high, slightly mealy or hoary. *Branchlets* faintly ribbed, densely tomentose, hairs hyaline. Stipules persistent, reddish, triangular, 1-2 mm long, pubescent, fimbriate with age. Pulvinus 1-3 mm long, hairy. *Phyllodes* straight or slightly curved, narrowly elliptic, 32-80(130) mm long, 4-8 mm wide, L/W 6-15, sparsely to densely pubescent, hairs hyaline, longitudinal veins numerous and closely spaced, one more prominent, anastomoses absent, base attenuate, apex acute, mucro oblique or hooked. Glands 1-2, near base and on

dorsal margin. *Inflorescences* on simple axillary peduncles, 1-2 per axil. *Spikes* yellow, 20-50 mm long, 3-5 mm wide, densely flowered; peduncle 1-1.5 mm long, hairy, rachis hairy. *Pods* stipitate, olivaceous to brown, linear to oblong, slightly curved, cylindrical, 42-90 mm long, 3-4 mm wide, coriaceous, vernicose, glabrous or hairy, longitudinally wrinkled, acute. *Seeds* longitudinal in pod, brown, faintly mottled, flattened oblong, 4-5 mm long, 2-3 mm wide. *Flowering*: Apr - Oct; fruiting: Sept - Oct. Fig. 2

An NT endemic found from the DR to the Gulf with one odd record for central Australia. Rare in the DR where known from one locality south of Adelaide River.

**A. difficilis Maiden**

Erect *shrub* or tree, 2.5-9 m high. Bark reddish, fibrous and fissured when old. *Branchlets* terete, glabrous to densely tomentose, hairs hyaline. Stipules caducous. Pulvinus 6-9 mm long, glabrous or hairy. *Phyllodes* curved, dimidiate, broadest a middle or falcate-dimidiate, 55-200 mm long, 15-35(51) mm wide, L/W 2.6-7.6, glabrous or densely tomentose, hairs hyaline, longitudinal veins numerous and closely spaced, 3(4) more prominent, anastomoses sparse or absent, base attenuate and oblique, apex acute or obtuse and asymmetric, mucro oblique. Glands 1, at pulvinus. *Inflorescences* on simple axillary peduncles, 1-5 per axil or extended axillary racemes, 2-6 heads per raceme, axis length 20-75 mm long. *Spikes* yellow, 25-39 mm long, 4-6 mm wide, densely flowered; peduncle 2-7 mm long, glabrous or hairy, rachis glabrous. *Pods* stipitate, brown, linear to oblong, straight or curved, cylindrical, 30-155 mm long, 3-4 mm wide, coriaceous, subglaucous or pruinose, glabrous or hairy, longitudinally wrinkled, acute. *Seeds* longitudinal in pod, black, slightly flattened oblong, 5-9 mm long, 2.7-3.7 mm wide. *Flowering*: June - Sept; fruiting: Aug - Oct. Fig. 2

In the Top End north of 18° S and extending into the Qld Gulf. Common in the DR on alluvial sandy soils associated with levees and open forest.

**A. dimidiata Benth.**

Erect *shrub* or small tree, 2-4 m high. *Branchlets* ribbed, densely tomentose, hairs erect, silvery. Stipules persistent, brown, narrow-triangular, 2 mm long, pubescent. Pulvinus 3-9 mm long, hairy. *Phyllodes* straight, dimidiate, broadest below middle, (37)70-155 mm long, (16)35-95 mm wide, L/W 1.2-2.4, slightly vernicose, sparsely tomentose, hairs closely appressed, hyaline, primary veins 4-5,

concurrent with lower margin near base, secondary veins oblique or penniveined, reticulate, base asymmetrical or oblique, apex obtuse and asymmetric, mucro straight. Glands prominent, 1, at pulvinus. *Inflorescences* on simple axillary peduncles, 1-4 per axil. *Spikes* deep yellow to golden, 42-80 mm long, 4-7 mm wide, loosely flowered; peduncle 0-2 mm long, hairy, rachis hairy. *Pods* stipitate, brown, linear to oblong, straight, raised over seeds, 70-170 mm long, 3.5-5 mm wide, coriaceous, slightly resinous, hairy, longitudinally wrinkled, acute. *Seeds* longitudinal in pod, black, flattened oblong, 5.5-8 mm long, 3.5-4 mm wide. *Flowering*: Mar - July; *fruiting*: Aug - Oct. Fig. 4

Top End with extensions into the Qld Gulf and the Kimberley. Common in the DR in open forest.

**\*A. dunnii** (Maiden) Turrill

Erect *shrub* or small tree, 3-5 m high, pruinose. Bark white, smooth. *Branchlets* terete, pruinose, glabrous. *Stipules* caducous. *Pulvinus* 5-20 mm long, glabrous. *Phyllodes* curved or falcate, dimidiate, 120-365 mm long, 68-162 mm wide, L/W 1.5-2.3, typically pruinose, glabrous, primary veins 3-5, concurrent with lower margin near base, secondary veins oblique or penniveined, reticulate, base asymmetrical or oblique, apex acute to obtuse. Glands prominent, 3-5, scattered along dorsal margin. *Inflorescences* terminal panicles, axis length 215-270 mm long. *Heads* globular, yellow, 8-15 mm wide; peduncle 8-20 mm long, pruinose, glabrous. *Pods* stipitate, brown, linear to oblong, straight or slightly curved, flat, 61-145 mm long, 24-30 mm wide, woody, glaucous or pruinose, glabrous, transversely reticulately nerved, margin thickened, apiculate. *Seeds* transverse in pod, brown, oblong to ellipsoid, flattened with squarish edges and enclosed in membranous sheath in pod, 9-11 mm long, 7-8 mm wide. *Flowering* and *fruiting* sporadically throughout the year. Fig. 4

Kimberley and western VRD on sandstone. Commonly cultivated and occasionally an escapee in the DR.

**A. farnesiana** (L.) Willd.

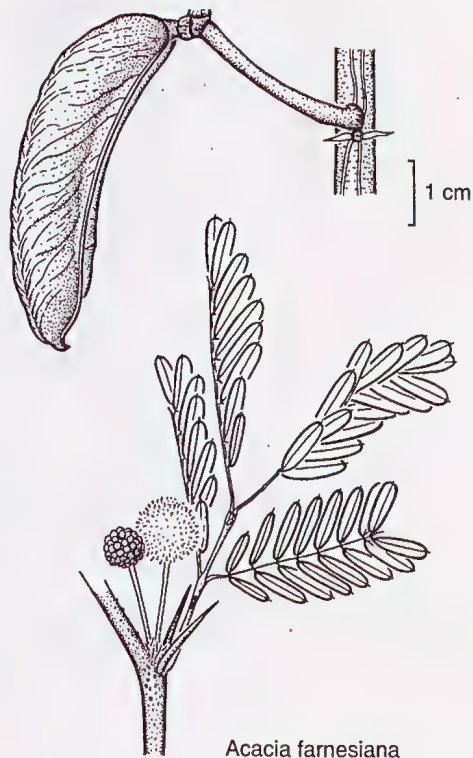
*Shrub*, 1.5-4 m high. Bark smooth, brown to grey. *Branchlets* brown to reddish, terete, lenticular, glabrous. *Stipules* persistent, white, spinose, subulate, 4-28 mm long, glabrous. *Leaves* bipinnate. *Pulvinus* 1-3 mm long, glabrous. Leaf rachis 5-55 mm long, 1-4 pairs of pinnae per leaf, hairy on grooved upper surface, jugary glands present, interjugary glands absent; *pinnae* 6-32 mm long, 5-14 pairs of leaflets

per pinna; *leaflets* linear-oblong, flat, 5.5-10 mm long, 2-3.2 mm wide L/W 2.8-4.3, concolorous, glabrous. *Inflorescences* on simple axillary peduncles. *Heads* globular, yellow, 10-11 mm wide; peduncle 10-28 mm long, hairy. *Pods* stipitate or sessile, dark brown, paler on sutures, linear to oblong, straight or curved, cylindrical, indehiscent, 40-70 mm long, 8-12 mm wide, glabrous, longitudinally wrinkled, apiculate. *Seeds* oblique in pod, olivaceous, irregularly ellipsoid, 6-9 mm long, 4.5-5.5 mm wide. *Flowering*: June - Aug; *fruiting*: Nov - Dec. Fig. 3

Widespread throughout the tropics; in Australia from the arid zone to northern Australia; common in alluvial situations. Rare in the DR with one record from the mouth of the Daly River and several collections around Darwin. Pedley (1978) has argued that this species is an introduction to Australia but if so then the introduction almost certainly occurred before white settlement. It is of weedy habit and can form dense thickets.

**A. gonocarpa** F.Muell.

Erect *shrub*, 0.5-2(3) m high. *Branchlets* angular, resinous, glabrous. *Stipules* persistent, white, linear, 0.4-0.7 mm long, glabrous. *Pulvinus* 0.5-1 mm long, glabrous. *Phyllodes* straight, linear, 12-125 mm long, (0.6)1-5 mm wide, L/W 9.3-33.3(116), glabrous, primary veins 1, secondary veins parallel and widely



*Acacia farnesiana*



Acacia

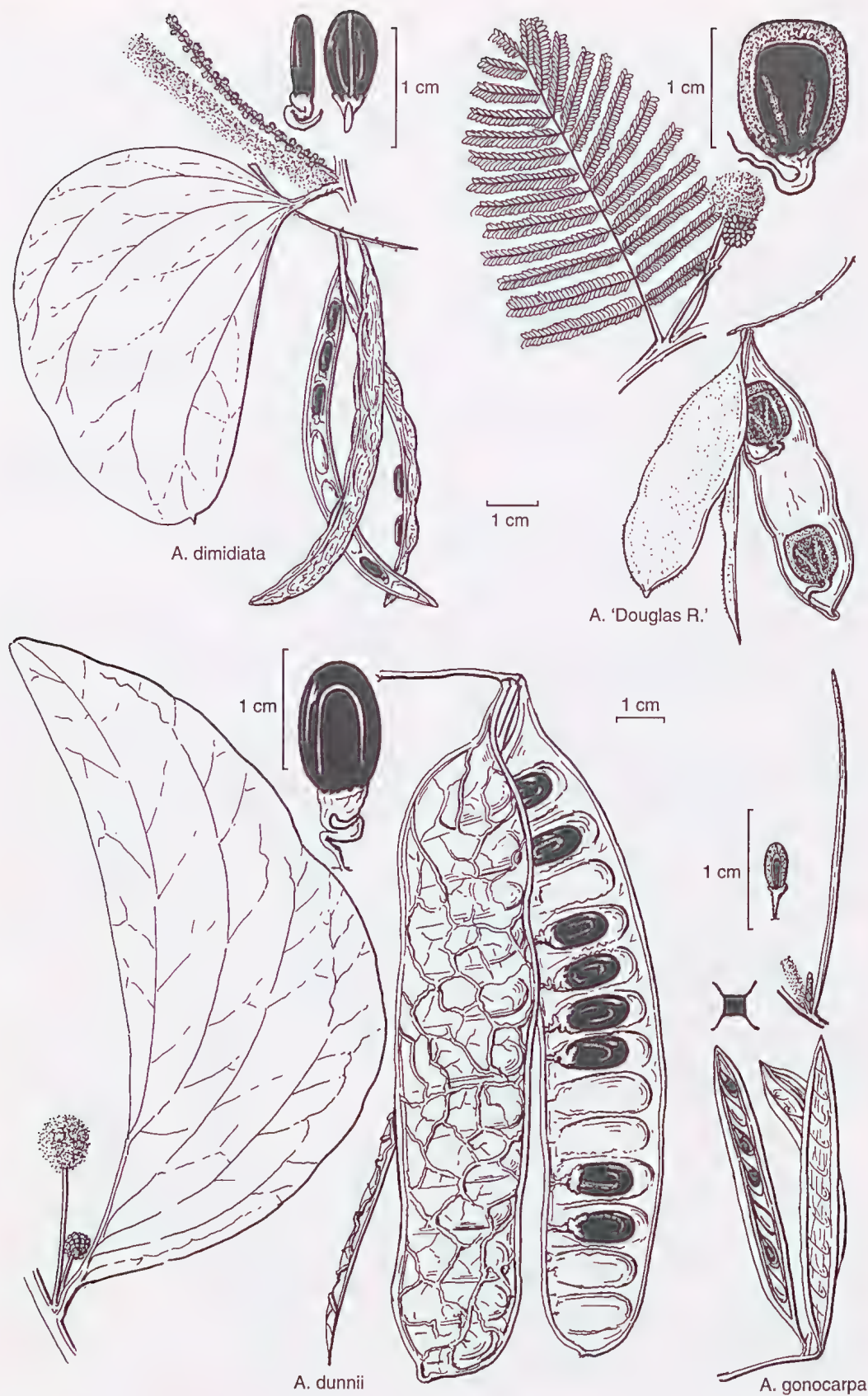


Fig. 4

spaced, not anastomosing or only sparsely so in broader phyllodes, apex acute, mucro straight, oblique or slightly hooked. Glands inconspicuous, 1, at pulvinus. *Inflorescences* on simple axillary peduncles, mostly 2 per axil. *Spikes* pale yellow to white, 15-40 mm long, 2-4 mm wide, flowers interrupted; peduncle 0.5-3 mm long, resinous, glabrous, rachis resinous, glabrous. *Pods* stipitate, brown, broadest towards apex and tapered to base, straight to curved, flat, opening elastically from apex, 50-90 mm long, 5-6(10) mm wide, woody, glabrous, obliquely reticulately nerved although sometimes obscure, margin with (0.6)2-5 mm broad wing, acute and narrowing abruptly. *Seeds* oblique in pod, brown, narrowly oblong to ellipsoid, 5 mm long, 2.2-2.5 mm wide. *Flowering* and fruiting throughout the year but typically during the hottest months. Fig. 4

In the Kimberley and Top End of the NT; rare in the DR where found associated with sandstone or sandy soils in Litchfield NP and Darwin R. area.

#### **A. helicophylla** Pedley

Erect spindly *shrub*, 2-4 m high, viscid. Bark reddish to brown to black, minni ritchi. *Branchlets* angular, viscid, sparsely hairy, hairs closely appressed, hyaline. Stipules persistent, reddish, triangular, 3 mm long, glabrous and resinous. Pulvinus 2-4 mm long, hairy. *Phyllodes* twisted, narrowly elliptic to elliptic, 45-110 mm long, 5-28 mm wide, L/W 2.7-13, viscid, sparsely hairy, hairs closely appressed, hyaline but sometimes appearing yellow due to resin, primary veins 1, secondary veins parallel and widely spaced, sparsely or loosely anastomosing, base attenuate, apex obtuse, mucro straight, oblique or slightly curved to 3 mm long. Glands prominent, 1, near base. *Inflorescences* on simple axillary peduncles. *Spikes* yellow, 20-35 mm long, 5-7 mm wide, densely flowered; peduncle 9-22 mm long, viscid, sparsely hairy, rachis glabrous. *Pods* shortly stipitate, brown, linear to oblong, slightly curved, raised over seeds, 30-60 mm long, 5-8 mm wide, coriaceous, sparsely to densely hairy, transversely reticulately nerved, acute. *Seeds* ± longitudinal to oblique in pod, brown, flattened ellipsoid or rhomboid, 5-5.5 mm long, 4 mm wide. *Flowering*: Mar - Aug; fruiting: Apr - Dec. Fig. 5

An NT endemic found scattered on sandstone from Katherine Gorge to Kakadu. In the DR only known from Mt. Douglas.

#### **A. hemignosta** F.Muell.

Erect *shrub* or small tree, 2-5(7) m high, glaucous or pruinose. Bark grey, fissured. *Branchlets* slightly

ribbed, pruinose, glabrous. Stipules caducous. Pulvinus 1.5-3 mm long, glabrous. *Phyllodes* straight or slightly curved, dimidiate or oblanceolate, narrowly to rarely broadly spatulate, 40-135 mm long, 5.5-35 mm wide, L/W 2.8-20, pruinose, glabrous, primary veins 3, secondary veins obscure, reticulate, base attenuate, apex obtuse. Glands 1, near base. *Inflorescences* extended axillary racemes or panicles or rarely on simple axillary peduncles, 8-27 heads per raceme, axis length 38-130 mm long. *Heads* globular, yellow, 4-6 mm wide; peduncle 3-10(14) mm long, often pruinose, glabrous. *Pods* stipitate, brown, linear to oblong, straight, raised over seeds with domed projections, 30-120 mm long, 9-15 mm wide, coriaceous, smooth, glabrous, faintly transversely reticulately nerved or nerves obscure, margin thickened, acute. *Seeds* brown, discoid, 5.5-6.5 mm long, 5.5-6.5 mm wide. *Flowering*: May - Oct but mostly June - July; fruiting: June - Nov. Fig. 5

Widely distributed across northern Australia extending to the southern limits of the monsoon area (22° S). In the DR found in woodland on gravelly soils in the southern part of the region.

#### **A. holosericea** Cunn. ex G.Don

Erect *shrub*, 2-5 m high. *Branchlets* flattened, densely sericeous or rarely glabrous, hairs hyaline. Stipules persistent, white, triangular, 1.5-2 mm long, pubescent. Pulvinus 7-9 mm long, hairy. *Phyllodes* straight, elliptic or dimidiate, broadest about middle, 100-225 mm long, 20-50(60) mm wide, L/W 3.5-6, usually densely sericeous or rarely glabrous, hairs hyaline, primary veins 3(4), concurrent with lower margin near base, secondary veins oblique or penniveined, reticulate, base attenuate, apex acute to obtuse, mucro straight. Glands prominent, 2, near mucro and near base. *Inflorescences* on simple axillary peduncles, 2 per axil. *Spikes* yellow, 42-55 mm long, 3-6 mm wide, with flowers interrupted; peduncle 3-7 mm long, hairy, rachis glabrous. *Pods* shortly stipitate, reddish brown, linear to oblong, coiled and intertwined, persisting on rachis, raised over seeds, 4-5 mm wide, coriaceous, glabrous or with minute scattered hairs, nerves obscure, acute. *Seeds* longitudinal in pod, dark brown to black, oblong, 4-5 mm long, 2-3 mm wide. *Flowering*: June - Sept; fruiting: pods persisting throughout the year. Fig. 5

Across northern Australia; common in the DR, especially on disturbed sites. Recent work (Maslin & Thomson, 1992) has segregated 2 further species (*A. colei* Maslin & L.Thomson and *A. neurocarpa* Cunn. ex Hook.) from the *A. holosericea* complex. Neither of these two taxa has been recorded in the DR.



Acacia

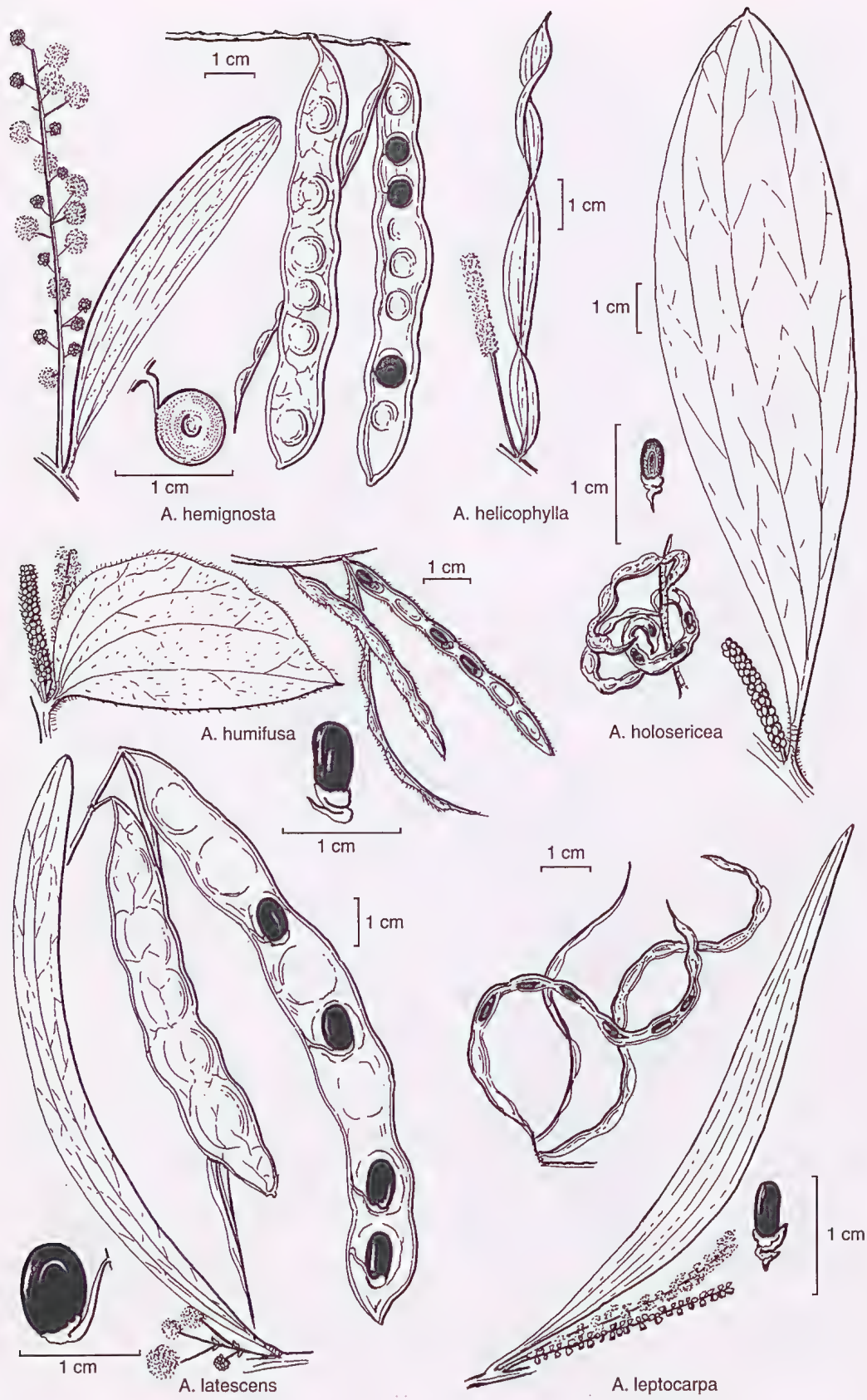


Fig. 5

**A. humifusa** Cunn. ex Benth.

Spreading *shrub*, 0.3-2 m high. *Branchlets* terete, densely tomentose, hairs erect, hyaline. *Stipules* persistent, white, triangular, 2 mm long, pubescent. *Pulvinus* 3-10 mm long, hairy. *Phyllodes* straight, dimidiate, broadest towards base, 25-76 mm long, 15-52 mm wide, L/W 1.2-2.3, densely tomentose, hairs erect, hyaline, primary veins 3(4), concurrent with lower margin near base, secondary veins oblique or penniveined, reticulate, base asymmetrical or oblique, apex acute to obtuse, mucro straight. Glands prominent, 1, at pulvinus. *Inflorescences* on simple axillary peduncles, 1-2 per axil. *Spikes* yellow, 10-70 mm long, 5-6 mm wide, with flowers dense to interrupted; peduncle 0-13 mm long, hairy, rachis hairy. *Pods* sessile, brown, linear to oblong, slightly curved, raised over seeds, 15-75 mm long, 3.5-4.5 mm wide, coriaceous, hairy, nerves obscure, obtuse. *Seeds* longitudinal in pod, black, oblong to cylindrical, 6.5 mm long, 3 mm wide. *Flowering*: throughout the year; fruiting: Mar - July. Fig. 5

Widespread across northern Australia from the Kimberley to Cape York. Scattered localities in DR on skeletal or lateritic soils, typically on sandstone plateaux and scree slopes.

**A. latescens** Benth.

Erect *tree*, 4-9 m high. Bark brown, fissured. *Branchlets* slightly angular and ribbed, glabrous. *Stipules* caducous. *Pulvinus* 3-5 mm long, glabrous. *Phyllodes* curved, linear to narrowly oblanceolate, 80-260 mm long, 4-18 mm wide, L/W 7.3-60, glabrous, primary veins 2, rarely 1 or 3, secondary veins oblique or penniveined, reticulate, base attenuate, apex acute. Glands 3, scattered along dorsal margin and at pulvinus. *Inflorescences* extended axillary racemes or panicles, 4-11 heads per raceme, axis length 10-30 mm long. *Heads* globular, white to cream, 4-6 mm wide; peduncle 5-16 mm long, glabrous. *Pods* stipitate, greyish, linear to oblong or rarely slightly constricted between seeds, straight, raised over seeds and slightly domed, 50-210 mm long, 11-20 mm wide, coriaceous, smooth, glabrous, transversely reticulately nerved, margin thickened slightly, acute. *Seeds* oblique in pod, dark brown to black, flattened ellipsoid, 9-10 mm long, 5-7 mm wide. *Flowering*: Apr - July; fruiting: Aug - Jan. Fig. 5

An NT endemic; common in eucalypt woodland across the Top End. Common in the DR. Forms with very narrow phyllodes commonly occur on sandstone substrates.

**A. leptocarpa** Cunn. ex Benth.

*Tree*, 5-15 m high. Bark brown to grey, fissured. *Branchlets* angular, glabrous. *Stipules* persistent, reddish, narrow-triangular, 0.9 mm long, glabrous. *Pulvinus* 4-6 mm long, glabrous. *Phyllodes* curved, narrowly elliptic, 115-175(270) mm long, 7-27(55) mm wide, L/W (4.5)7.2-17.2, glabrous, primary veins 3(4), secondary veins parallel and widely spaced, sparsely anastomosing, base attenuate, apex acute, mucro straight. Glands inconspicuous, 1, near base. *Inflorescences* on simple axillary peduncles, mostly 2 per axil. *Spikes* yellow, 30-63 mm long, 4-6 mm wide, loosely flowered; peduncle 3-10 mm long, glabrous, rachis glabrous. *Pods* stipitate, brown with pale margins, linear to oblong, curved to weakly coiled, raised over seeds, 115-150 mm long, 3.5-4 mm wide, coriaceous, glabrous, nerves obscure or absent, margin thickened, acute. *Seeds* longitudinal in pod, black, flattened oblong, 3.5-5 mm long, 2-3 mm wide. *Flowering*: May - Oct; fruiting: Sept - Nov. Fig. 5

Top End to Cape York and coastal southern Qld; also New Guinea. Uncommon in the DR where known from Melville Is. and the Elizabeth R. Coastal localities on sandy soils.

**\*A. mangium** Willd.

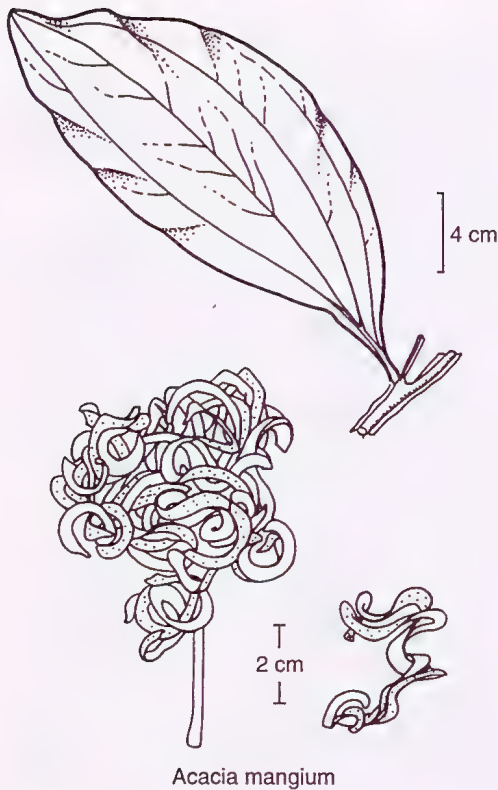
*Tree*, 10 m high. Bark grey. *Branchlets* angular and ribbed, glabrous. *Stipules* caducous, brown, triangular, 1 mm long, glabrous. *Pulvinus* 4-8 mm long, glabrous, winged on lower margin. *Phyllodes* straight, dimidiate, broadest at middle, 115-185 mm long, 23-64 mm wide, L/W 3.7-5, punctulate, glabrous, main longitudinal nerves 4, basally confluent but distant from lower margin, distant, anastomoses numerous in a longitudinally elongated reticulum, base oblique, apex acute, mucro straight, blunt and knob-like. Glands 1, 0-3 mm above pulvinus, broadly swollen around circular orifice. *Inflorescences* racemose, 2-3 heads per raceme, raceme axis 1 mm long. *Spikes* pale yellow, 96 mm long, 6 mm wide, flowers interrupted; peduncle 10 mm long, hairy, rachis hairy. *Pods* sessile, brown, linear to oblong, coiled, flat, c. 120 mm long, 5 mm wide, coriaceous, glabrous, nerves obscure or absent, acute. *Seeds* not seen. *Flowering*: Jan; fruiting: old fruits without seed in Jan. Fig. 6

Cultivated in the DR; native to north Qld and New Guinea and now widely cultivated in plantations for timber.

**A. mimula** Pedley

Erect *tree*, to 7 m high. Bark dark grey, fissured





Acacia mangium

Fig. 6

with horizontal cuts. *Branchlets* flattened, glabrous. *Stipules* caducous. *Pulvinus* 3-4 mm long, minutely hairy. *Phyllodes* curved, elliptic to oblanceolate, 70-180 mm long, 7-35 mm wide, L/W 4.5-10, glabrous, primary veins 2-3, secondary veins oblique or penniveined, reticulate, base attenuate, apex obtuse. Glands 4-5, scattered along dorsal margin to near base. *Inflorescences* extended axillary racemes or panicles, 9-24 heads per raceme, axis length 65-150 mm long. *Heads* globular, white to cream, 6-9 mm wide; peduncle 6-14 mm long, glabrous. *Pods* stipitate, greyish, linear to oblong, slightly curved, flat, 75-130 mm long, 20-28 mm wide, woody, smooth, glabrous, obliquely reticulately nerved or transversely reticulately nerved, acute. *Seeds* transverse in pod, brown, broadly ellipsoid, 10 mm long, 7-9 mm wide. *Flowering*: Apr - June; fruiting: Aug - Sept. Fig. 7

An NT endemic found from the DR to western Arnhem Land. Common in the DR in open forest. May be confused with *A. latescens*.

**\*A. mountfordiae** Specht

Erect *shrub*, 2-4 m high, sometimes pruinose. Bark grey in older plants, fissured. *Branchlets* terete, sometimes pruinose, glabrous or densely hairy, hairs

erect, hyaline. *Stipules* persistent, white, narrow-triangular, 1 mm long, glabrous. *Pulvinus* absent. *Phyllodes* straight or rarely curved, dimidiate, 16-49 mm long, 6-20 mm wide, L/W 1.6-2.8(4.3), sometimes pruinose, glabrous or densely hairy, hairs erect, yellow to golden, primary veins 2-3, scarcely visible, secondary veins obscure, closely reticulate, base attenuate, apex obtuse and asymmetric, mucro oblique, caducous. Glands 1, near base. *Inflorescences* on simple axillary peduncles, 1-2 per axil. *Spikes* deep yellow to golden, 17-45 mm long, 5-7 mm wide, densely flowered; peduncle 7-23 mm long, glabrous or hairy, rachis glabrous. *Pods* shortly stipitate or sessile, brown, linear to oblong, straight or slightly curved, flat, 20-52 mm long, 5-9 mm wide, coriaceous, slightly resinous, glabrous, longitudinally wrinkled, obtuse. *Seeds* oblique in pod, olivaceous, angular oblong, 4-5.5 mm long, 3-4 mm wide. *Flowering*: June - Oct; fruiting: Oct. Fig. 7

Endemic to the Oenpelli area on sandstone. Widely cultivated in Darwin.

**A. multisiliqua** (Benth.) Maconochie

Erect *shrub* or prostrate in exposed coastal situations, to 2.5 m high. Bark smooth. *Branchlets* faintly ribbed, glabrous. *Stipules* persistent, reddish, triangular, 0.5 mm long, glabrous. *Pulvinus* 3 mm long, glabrous. *Phyllodes* straight or curved, narrow-elliptic to lanceolate, 20-82 mm long, 2.5-12 mm wide, L/W 3.3-12.9, glabrous, primary veins 3 rarely more on coastal forms, secondary veins parallel and widely spaced, sparsely or loosely anastomosing, base attenuate, apex acute to obtuse, mucro oblique. Glands 1-2, near base or scattered along dorsal margin. *Inflorescences* on simple axillary peduncles. *Heads* globular, yellow, 4-5 mm wide; peduncle 3-6 mm long, glabrous. *Pods* stipitate, brown, moniliform, straight, raised over seeds, 35-74 mm long, 3-5(7) mm wide, coriaceous, smooth, glabrous, nerves obscure or absent, acute. *Seeds* longitudinal in pod, brown, flattened oblong or ellipsoid, 3.5-5 mm long, 2-3 mm wide. *Flowering*: all year; fruiting: Mar - Nov. Fig. 7

Widespread across northern Australia but uncommon in the DR. Typically found on rocky slopes.

**A. nuperrima** E.G.Baker

Spreading *shrub*, to 1 m high, scurfy resinous or mealy. Bark smooth. *Branchlets* ribbed, resinous becoming mealy or hoary with minute stellate crystals, glabrous. *Stipules* persistent, reddish, narrow-triangular, 1 mm long, resinous. *Pulvinus* 0.2 mm long, glabrous. *Phyllodes* curved or straight,

Acacia

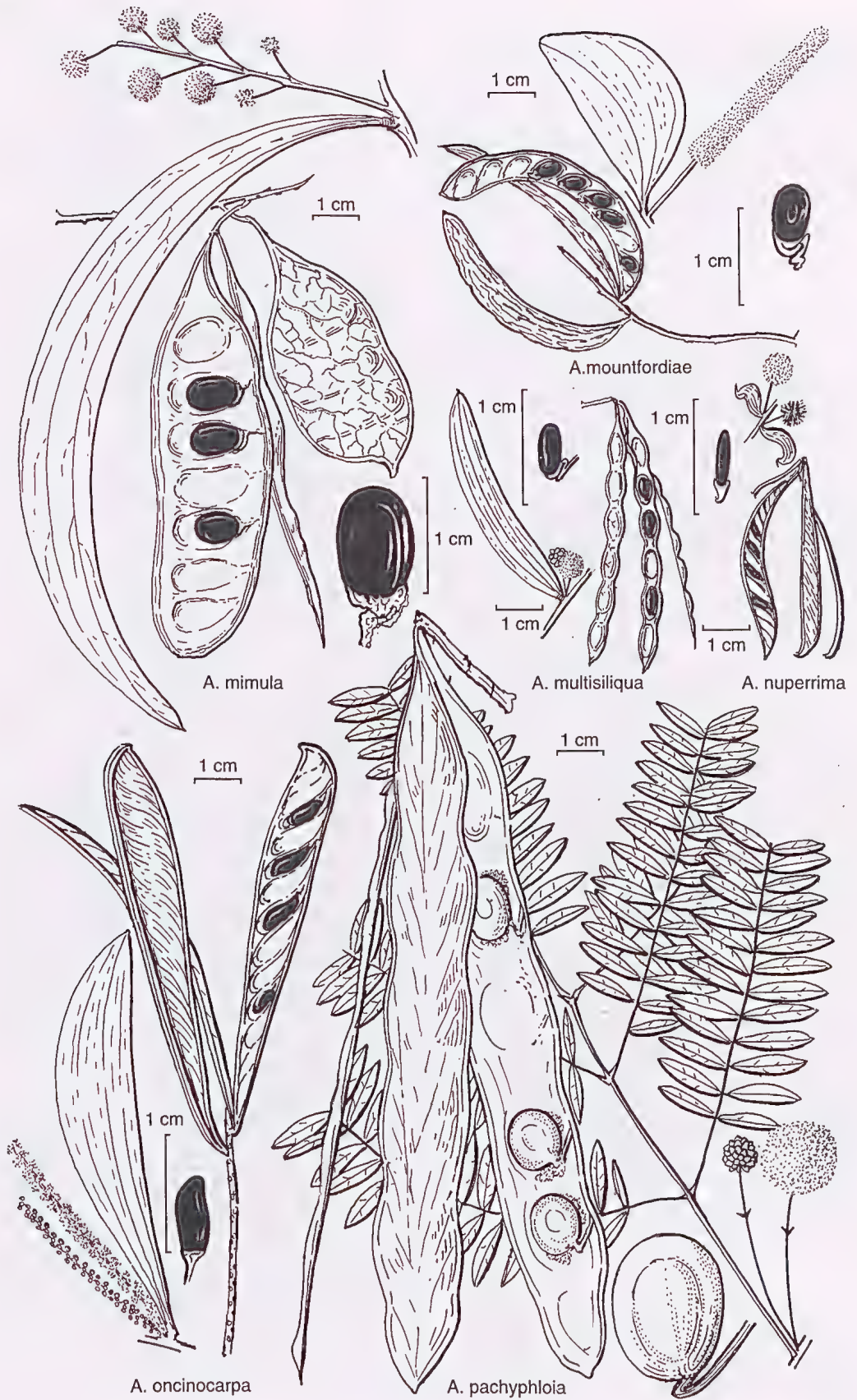


Fig. 7



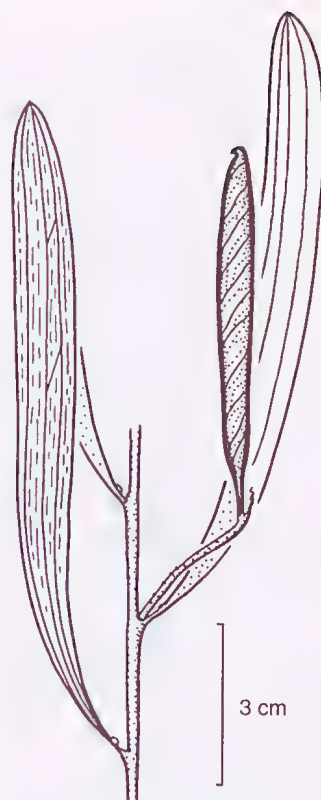
triangular or linear or narrowly elliptic, 6-24 mm long, 1-3 mm wide, L/W 3.3-11, resinous or hoary with minute stellate crystals, coriaceous to rigid, glabrous, primary veins obscure but surface longitudinally striate, secondary veins obscure, sparsely anastomosing, base attenuate and oblique, apex asymmetric. Glands 1, near base. *Inflorescences* on simple axillary peduncles. *Heads* globular, pale yellow, 4-7 mm wide; peduncle 7-15 mm long, resinous, glabrous. *Pods* sessile, olivaceous, broadest towards apex and tapered to base, straight, flat, opening elastically from apex, 22-67 mm long, 3-5 mm wide, woody, resinous, glabrous, obliquely reticulately nerved, margin thickened slightly, hooked. *Seeds* oblique in pod, brown, flattened oblong, 4.5-5 mm long, 1.7-2.2 mm wide. *Flowering*: Feb - Dec; *fruiting*: Feb - August. Fig. 7

Across northern Australia north of 18° S in a variety of habitats. Rare in the DR where known only from Litchfield NP on sandstone.

#### *A. oligoneura* F.Muell.

Open *shrub*, 1-1.5 m high, thin stems arising from woody rootstock after fire. *Branchlets* terete or slightly ribbed, resinous with resin scattered and scurfy in appearance, glabrous. *Stipules* caducous. *Pulvinus* 1.5-3 mm long, glabrous. *Phyllodes* straight or slightly curved, narrowly oblanceolate, 110-137(190) mm long, 12.5-20 mm wide, L/W 7.3-10.8, sparsely resinous as branchlets, glabrous, main longitudinal nerves 3, distant, anastomoses numerous forming a longitudinally elongated reticulum, base attenuate, apex obtuse, mucro short and knob-like, oblique or straight or obscure. Glands 1, first gland 0-4 mm above pulvinus. *Inflorescences* on simple axillary peduncles, 1-3 per axil, or terminal panicles. *Spikes* yellow, 18-30 mm long, 4.5-6.5 mm wide, densely to loosely flowered; peduncle 5.5-8 mm long, resinous, glabrous, rachis resinous, glabrous. *Pods* sessile, brown, broadest towards apex and tapered to base, straight, flat, opening elastically from apex, 78-82 mm long, 5-7.5 mm wide, woody, resinous but dull and scurfy, glabrous, obliquely reticulately nerved, hooked or acute. *Seeds* oblique in pod, brown, narrowly ellipsoid or oblong, 5-5.5 mm long, 2-2.5 mm wide. *Flowering*: Jan - May; *fruiting*: Dec. Fig. 8

From the DR to the VRD and Kimberley; uncommon in the DR where recorded from Noonamah to Litchfield and the Daly River area. A poorly known species only recently recognised in the DR. Open woodland on rocky slopes.



*Acacia oligoneura*

Fig. 8

#### *A. oncinocarpa* Benth.

Spreading *shrub* or tree, 1.5-4 m high. Bark grey, fissured. *Branchlets* slightly angular, blotchy with reddish patches of resin, glabrous. *Stipules* persistent, white, narrow-triangular, 1 mm long, glabrous. *Pulvinus* 2-3 mm long, glabrous. *Phyllodes* straight or curved, narrowly elliptic to elliptic, 58-110 mm long, (4)7-29 mm wide, L/W 3-9.3(20), glabrous, primary veins 3 but sometimes obscure, secondary veins parallel and widely spaced, anastomoses absent or very sparsely anastomosing, base attenuate, apex acute to obtuse, mucro straight or hooked. Glands 1, at pulvinus. *Inflorescences* on simple axillary peduncles, 1-4 per axil. *Spikes* pale yellow, 33-80 mm long, 3-6 mm wide, loosely flowered; peduncle 2-7 mm long, slightly resinous, glabrous, rachis slightly resinous, glabrous. *Pods* sessile, yellowish to brown, broadest towards apex and tapered to base or linear to oblong, straight, flat, opening elastically from apex, 55-110 mm long, 4.5-10 mm wide, woody, scurfy resinous, glabrous, obliquely reticulately nerved, margin thickened, hooked. *Seeds* oblique in pod, brown, oblong to ellipsoid, 4-6 mm long, 2-3.5 mm wide. *Flowering*: Mar - Aug, but around Darwin usually in May; *fruiting*: July - Oct. Fig. 7

Widespread across the Top End and extending into the Kimberley. Common in the DR in open forest on lateritic soil.

**A. pachyphloia** W.Fitzg. & Maiden

*Tree*, 3-10 m high. Bark off-white to yellowish grey, corky. *Branchlets* pendulous, angular, glabrous. Stipules caducous, spiny in juvenile plants. *Leaves* bipinnate. Pulvinus 2-3 mm long, glabrous. Leaf rachis 38-140 mm long, 2-4 pairs of pinnae per leaf, glabrous, jugary glands present, interjugary glands absent; pinnae 75-155 mm long, 13-34 pairs of leaflets per pinna; *leaflets* narrowly elliptic to oblanceolate, 5-28 mm long, 2-7 mm wide, L/W 2.5-5.6, concolorous, glabrous. *Inflorescences* on simple axillary peduncles or extended axillary racemes or panicles, 6-11 heads per raceme, axis length 40-100 mm long. *Heads* globular, white to cream, 14-18 mm wide; peduncle 20-54 mm long, glabrous. *Pods* stipitate, brown, linear to oblong, straight, raised over seeds, 50-93 mm long, 12-15 mm wide, woody, glabrous, longitudinally reticulately nerved, acute. *Seeds* longitudinal in pod, brown, broadly oblong, 12 mm long, 9-10 mm wide. *Flowering*: irregularly throughout the year; *fruiting*: mostly June - July. Fig. 7

Disjunctly distributed from the Kimberley to the western Top End and southern Arnhem Land. Restricted to southern part of DR in woodland on a wide variety of soils.

**A. pallidifolia** Tindale

*Tree*, 4-6 m high. Bark off-white to grey, corky. *Branchlets* terete, sparsely to densely tomentose, hairs erect, hyaline. Stipules persistent, reddish, spinose, 1 mm long, pubescent, stipular spines to 10 mm long present on juvenile growth. *Leaves* bipinnate. Pulvinus 3-9 mm long, hairy. Leaf rachis 90-245 mm long, 8-14 pairs of pinnae per leaf, hairy, jugary glands present at terminal pair of pinnae, interjugary glands absent; pinnae 45-95 mm long, (13)20-23 pairs of leaflets per pinna; *leaflets* linear-oblong to lanceolate, flat or slightly recurved, 6-14 mm long, 1-4 mm wide, L/W 3.6-6, lower surface slightly paler than the upper surface, glabrous. *Inflorescences* on simple axillary peduncles, 1-2 per axil. *Heads* globular, pale yellow, 9-13 mm wide; peduncle 16-53 mm long, with involucre at or just below middle, slightly hairy. *Pods* stipitate, brown, linear to oblong, straight, flat, 55-150 mm long, 12-22 mm wide, slightly woody, glabrous, longitudinally reticulately nerved, acute. *Seeds* longitudinal in pod, pale brown, discoid, 9 mm long, 8.5 mm wide. *Flowering*: Sept - Oct; *fruiting*: Nov. Fig. 9

The taxon described here is tentatively treated as conspecific with the poorly known *A. pallidifolia* from the VRD. Outside the VRD known from Kakadu NP, near Adelaide River and near the Bark Hut Inn. Found in open woodland on stony hills usually with *E. tectifica*. This taxon is also similar to another species, long known informally as *A. 'calcigera'*, which occurs further south in the Katherine area.

**A. pellita** O.Schwarz

*Erect shrub* or slender tree, 2-8 m high. *Branchlets* strongly ribbed and angular, densely tomentose, hairs erect, hyaline. Stipules persistent, brown, triangular, 1.5-2 mm long, pubescent. Pulvinus 6-10 mm long, hairy. *Phyllodes* straight, broadly elliptic, 70-180 mm long, 25-70 mm wide, L/W 2.1-4, densely tomentose, hairs erect, hyaline, primary veins 3, concurrent with lower margin near base, secondary veins oblique or penniveined, reticulate, base oblique, apex acute to obtuse, mucro straight. Glands prominent, 2, near mucro and at pulvinus. *Inflorescences* typically on simple axillary peduncles or rarely on short axillary shoots, 3 heads per raceme, axis length 20 mm long. *Spikes* yellow, 35-50 mm long, 5-6 mm wide, loosely to densely flowered; peduncle 3-4 mm long, hairy, rachis hairy. *Pods* sessile, greyish, linear to oblong, coiled and intertwined, persisting on rachis, raised over seeds, 4-5 mm wide, coriaceous, hairy, nerves obscure, obtuse. *Seeds* longitudinal in pod, brown, broadly oblong, 4.5-5 mm long, 3-4 mm wide. *Flowering*: June - Aug; *fruiting*: pods persisting throughout the year. Fig. 9

The Kimberley and western Top End north of 17° S. Found in the southern part of the DR in shady localities on sandy alluvium along creek lines.

**A. platycarpa** F.Muell.

*Shrub* or slender tree, 3-8 m high, usually pruinose. Bark reddish, smooth. *Branchlets* terete, pruinose, glabrous. Stipules persistent, brown, broad-triangular, 1 mm long, pubescent. Pulvinus 3-4 mm long, glabrous. *Phyllodes* straight or curved, dimidiate and generally broadest towards base, 52-190 mm long, 10-67 mm wide, L/W 2.5-5.2, slightly pruinose, glabrous, primary veins 3-4, concurrent with lower margin near base, secondary veins oblique or penniveined, reticulate and prominent, base oblique, apex acute or obtuse. Glands prominent, 4-5, at pulvinus and scattered along dorsal margin. *Inflorescences* terminal panicles, axis length 100-210 mm long. *Heads* globular, white to cream, 6-9 mm wide; peduncle 7-16 mm long, glabrous. *Pods* stipitate, brown, linear to oblong, straight or slightly curved, flat, 75-150 mm long, 18-30 mm wide, woody, pruinose, glabrous,



Acacia

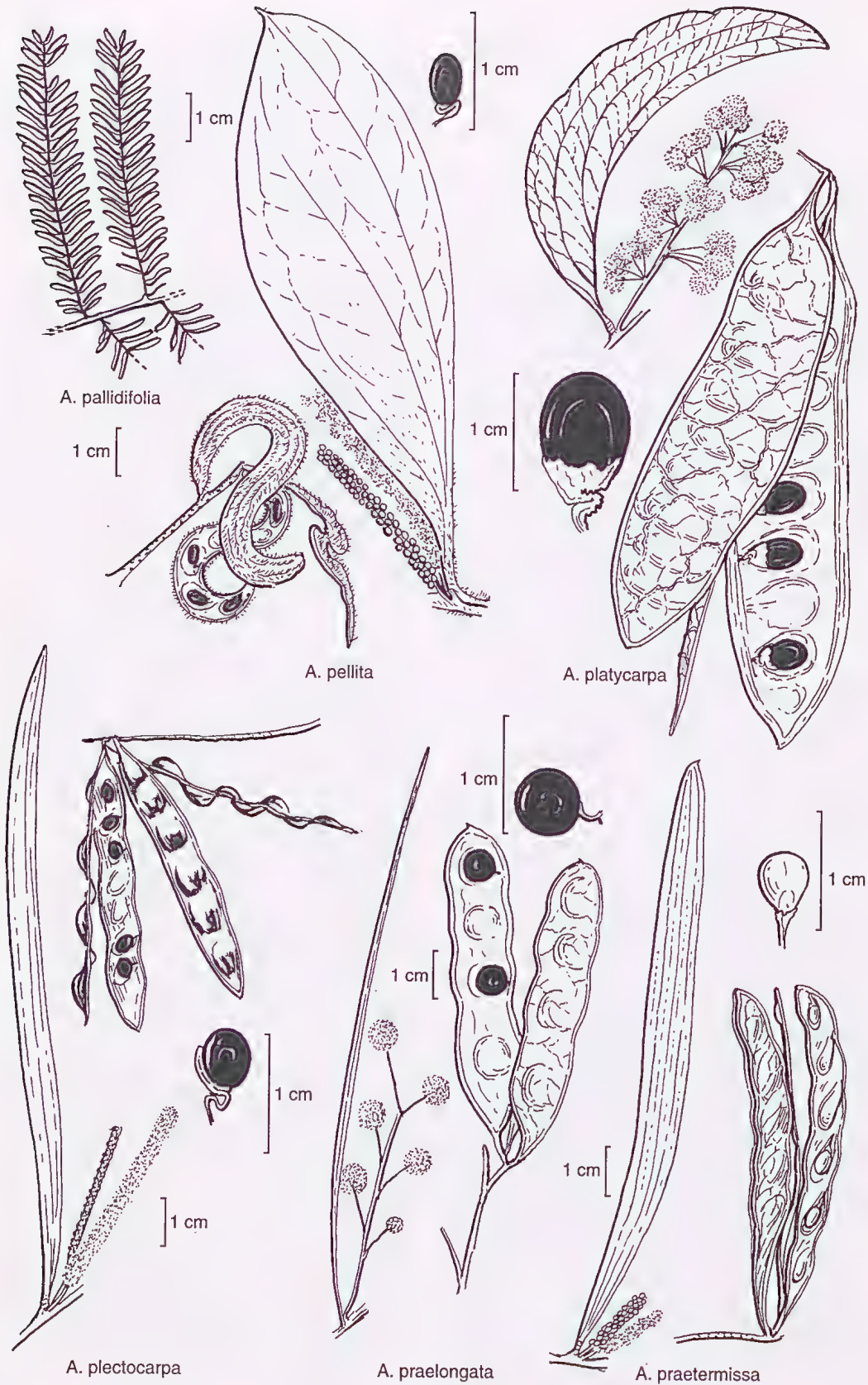


Fig. 9

transversely reticulately nerved; margin winged, 1.5-3 mm wide; acute. *Seeds* transverse in pod, brown, flattened ellipsoid, 8-9 mm long, 6-7 mm wide. *Flowering*: Nov - Mar; fruiting: May - Sept. Fig. 9

Northern Australia from Cape York to the Kimberley. Scattered in the DR in open forest. More common in the Katherine area. Measurements were made on specimens from the Darwin/Katherine area as material from the Gulf and the Kimberley shows considerable variation.

#### **A. plectocarpa** Cunn. ex Benth.

Tall *shrub* or small tree, 3-7 m high. Bark grey, fissured. *Branchlets* angular, glabrous. *Stipules* persistent, reddish, triangular, 0.8 mm long, glabrous. *Pulvinus* 2-4 mm long, glabrous. *Phyllodes* straight or curved, narrowly elliptic to linear, 120-195 mm long, 4.5-13 mm wide, L/W 12-31, glabrous, primary veins 1 with 2 prominent secondary veins, secondary veins parallel and closely spaced, not anastomosing, base attenuate, apex acute, mucro oblique or straight. Glands 1, at pulvinus. *Inflorescences* on simple axillary peduncles, 1-3 per axil. *Spikes* yellow, 15-55 mm long, 3-4 mm wide, densely flowered; peduncle 1-4.5 mm long, slightly resinous, glabrous, rachis glabrous. *Pods* stipitate, brown, linear to oblong, straight, raised over seeds alternately on each side, 53-80 mm long, 6-12 mm wide, coriaceous, resinous, glabrous, nerves obscure, obtuse. *Seeds* transverse in pod, black, discoid to ellipsoid, 4-4.2 mm long, 2.5-3.7 mm wide. *Flowering*: May - July; fruiting: July - Nov. Fig. 9

Eastern Arnhem Land to the Kimberley in open forest on sandy soils. Not common in the DR.

#### **A. praelongata** F.Muell.

*Tree*, 3-8 m high. Bark dark brown to black, fissured. *Branchlets* pendulous, ribbed to angular with swollen leaf nodes, glabrous. *Stipules* caducous. *Pulvinus* 1-1.5 mm long, glabrous. *Phyllodes* straight, linear, 120-205 mm long, 1-2.5 mm wide, L/W 74-180, coriaceous, glabrous, primary veins 1, secondary veins parallel and closely spaced, not anastomosing, apex acute, mucro oblique. Glands 1, near base. *Inflorescences* extended axillary racemes or panicles or rarely on simple axillary peduncles, 9-24 heads per raceme, axis length 33-150 mm long. *Heads* globular, pale yellow, 5-7 mm long; peduncle 4-15 mm long, glabrous. *Pods* stipitate, brown, linear to oblong, straight, raised over seeds, 35-80 mm long, 11-12 mm wide, chartaceous, smooth, glabrous, transversely reticulately nerved, margin

thickened slightly, acute. *Seeds* longitudinal in pod, brown, discoid, 5.5-7 mm long, 5.5-7 mm wide. *Flowering*: May - Sept; fruiting: June - Sept. Fig. 9

An NT endemic and restricted to the DR and Alligator Rivers area and the Cobourg Peninsula. Found in open forest and woodland on lateritic soils.

#### **A. praetermissa** Tindale

Erect *shrub*, 0.5-1.2 m high. *Branchlets* slightly angular, slightly pruinose, glabrous to glabrescent. *Stipules* persistent, brown, triangular, 1 mm long, slightly pubescent. *Pulvinus* 1-2 mm long, glabrous. *Phyllodes* straight or curved, narrowly oblanceolate or elliptic or linear, 110-150 mm long, 3-12(18) mm wide, L/W 8.3-45, glabrous, primary veins 1 but with several secondary veins almost as prominent, secondary veins parallel and widely spaced, sparsely anastomosing, base attenuate, apex acute to obtuse, mucro straight or oblique, c. 1.5 mm long. Glands 1, near base. *Inflorescences* on simple axillary peduncles, mostly 2 per axil. *Spikes* yellow, 8-23 mm long, 4-5 mm wide, loosely flowered; peduncle 5-18 mm long, glabrous, rachis glabrous. *Pods* sessile, brown, linear to oblong, straight, slightly raised over seeds, opening elastically from apex, 40-90 mm long, 6-8 mm wide, woody, glabrous, obliquely reticulately nerved, margin thickened, asymmetric and obtuse. *Seeds* oblique in pod, olivaceous, sub-discoid, 6 mm long, 4 mm wide. *Flowering*: Mar - Sept; fruiting: July - Aug. Fig. 9

A rare NT endemic on stony hills between Pine Creek and Hayes Creek; also in Litchfield NP.

#### **A. tolmerensis** G.Leach

*Shrub*. *Branchlets* flattened, glabrous. *Stipules* persistent, brown, oblong, 1 mm long, glabrous, ciliate. *Pulvinus* 4-6 mm long, glabrous. *Phyllodes* curved, dimidiate, 110-245 mm long, 50-88 mm wide, L/W 2.7-3, glabrous, primary veins 3-4, lower 2 nerves confluent near base, secondary veins oblique or penniveined, reticulate, base oblique, apex obtuse. Glands prominent, 4, scattered along dorsal margin and at pulvinus. *Inflorescences* axillary racemes or panicles or terminal panicles, 6-8 heads per raceme, axis length 55-80 mm long. *Heads* globular, yellow, 7-12 mm wide; peduncle 9-20 mm long, glabrous. *Pods* stipitate, greyish to brown, linear to oblong, straight, flat, 55-110 mm long, 20-30 mm wide, coriaceous, glabrous, transversely reticulately nerved, margin with obscure wing to 1 mm wide, apiculate. *Seeds* transverse in pod, brown, flattened ellipsoid, 8-10 mm long, 7-7.5 mm wide. *Flowering*: Nov - Feb; fruiting: May. Fig. 10



Only known from the Litchfield area. Similar to *A. platycarpa* but readily distinguished by the flattened/angular branchlets.

**A. torulosa** Benth.

*Shrub* to slender tree, 2-8 m high. Bark brown to grey, fissured, flaky at base. *Branchlets* angular, resinous, glabrous. *Stipules* persistent, reddish, narrow-triangular, 1 mm long, glabrous. *Pulvinus* 1.5-5 mm long, glabrous. *Phyllodes* straight to curved, narrowly elliptic to linear, 85-205 mm long, 4-12 mm wide, L/W 9-41, resinous, glabrous, primary veins 1, often with 2 prominent secondary veins, secondary veins parallel and closely spaced, not anastomosing, base attenuate, apex acute to obtuse, mucro straight or oblique. Glands 1, near base. *Inflorescences* on simple axillary peduncles and on short axillary shoots, 1-4 per axil, determinate or rarely indeterminate, 4 heads per raceme, axis length 10-18 mm long. *Spikes* deep yellow to golden, 9-53 mm long, 3-4 mm wide, densely flowered; peduncle 1-8 mm long, resinous, tomentose, rachis sparsely tomentose. *Pods* stipitate, yellowish to pale brown, moniliform, straight, raised over seeds, 85-200 mm long, 5-7 mm wide, coriaceous, vernicose, glabrous, longitudinally wrinkled, acute. *Seeds* longitudinal in pod, black, oblong, 5-7.5 mm long, 3-4.7 mm wide. *Flowering*: May - July; fruiting: Aug - Nov. Fig. 10

Widespread across the Top End and Cape York, extending to the sand dunes of northern part of Central Australia. Doubtfully recorded for the DR. In sandy habitats including coastal dunes.

**A. umbellata** Cunn. ex Benth.

Erect *shrub* or rarely a tree, 1-3(5) m high. *Branchlets* angular and ribbed, resinous, glabrous. *Stipules* persistent, reddish, narrow-triangular, 1 mm long, slightly resinous. *Pulvinus* 4-6 mm long, glabrous. *Phyllodes* straight, elliptic, 50-130 mm long, 10-39 mm wide, L/W 2.1-6.5, vernicose, glabrous, primary veins 1 with 2-6 raised secondary veins, secondary veins parallel and closely

spaced, not anastomosing, base attenuate and slightly oblique, apex acute to obtuse, mucro straight to oblique, umbonate. Glands 1, at pulvinus. *Inflorescences* on short axillary shoots, indeterminate, 2-4 heads per raceme, axis length 4-15 mm long. *Spikes* deep yellow to golden, 11-37 mm long, 4-5 mm wide, densely flowered; peduncle 2-9 mm long, resinous, glabrous, rachis resinous, glabrous. *Pods* sessile, brown, linear to oblong, curved, cylindrical, 20-70 mm long, 2.5-5 mm wide, stiffly coriaceous, resinous, glabrous, longitudinally wrinkled with pale, smooth margin, acute. *Seeds* longitudinal in pod, black, oblong, 3.5-5 mm long, 2-2.5 mm wide. *Flowering*: Jan - June; fruiting: June - Oct. Fig. 10

In the Top End, Gulf and Qld. Known in the DR north of Pine Creek. Often along seasonal creek lines in skeletal soils.

**A. 'Douglas R.'**

*Tree*, 3-7 m high. Bark grey, corky. *Branchlets* terete, sparsely hairy, hairs erect, hyaline. *Stipules* persistent, reddish, spinose, 1-5.5 mm long, glabrous. *Leaves* bipinnate. *Pulvinus* 2-4.5 mm long, hairy above. Leaf rachis 60-100 mm long, 12-28 pairs of pinnae per leaf, hairy above, jugary and interjugary glands absent. Leaf pinnae 12-28 mm long, 17-44 pairs of leaflets per pinna; *leaflets* linear-oblong, flat, 1.7-2 mm long, 0.7-0.9 mm wide, L/W 2-3, concolorous, glabrous to glabrescent. *Inflorescences* on simple axillary peduncles. *Heads* globular, white to cream, 10 mm wide; peduncle 26-35 mm long, hairy in part above involucrel. *Pods* stipitate, greyish to brown, linear to oblong, straight, flat, 40-65 mm long, 10-15 mm wide, stiffly coriaceous, hairy, nerves obscure, acute. *Seeds* longitudinal in pod, brown, oblong, 12 mm long, 9 mm wide. *Flowering*: Oct; fruiting: June - Aug. Fig. 4

The taxon described here is known only from the Douglas/Daly R. area and found on cracking clay soils. *A. ditricha* Pedley is described from Qld and is similar to the taxon described here. Further work is needed to determine if these taxa are conspecific.

## ADENANTHERA L.

A genus of about 8 species in tropical Asia and the Pacific; 2 species in Australia and only 1 species in the NT.

**A. pavonina** L.

*Tree* 8-20 m high. Bark smooth. *Pulvinus* not

evident. *Leaf* rachis glabrescent, 160-265 mm long, with 2-5 pairs of pinnae, often subopposite. Glands absent; pinnae 50-190 mm long with 12-16 alternate

Acacia

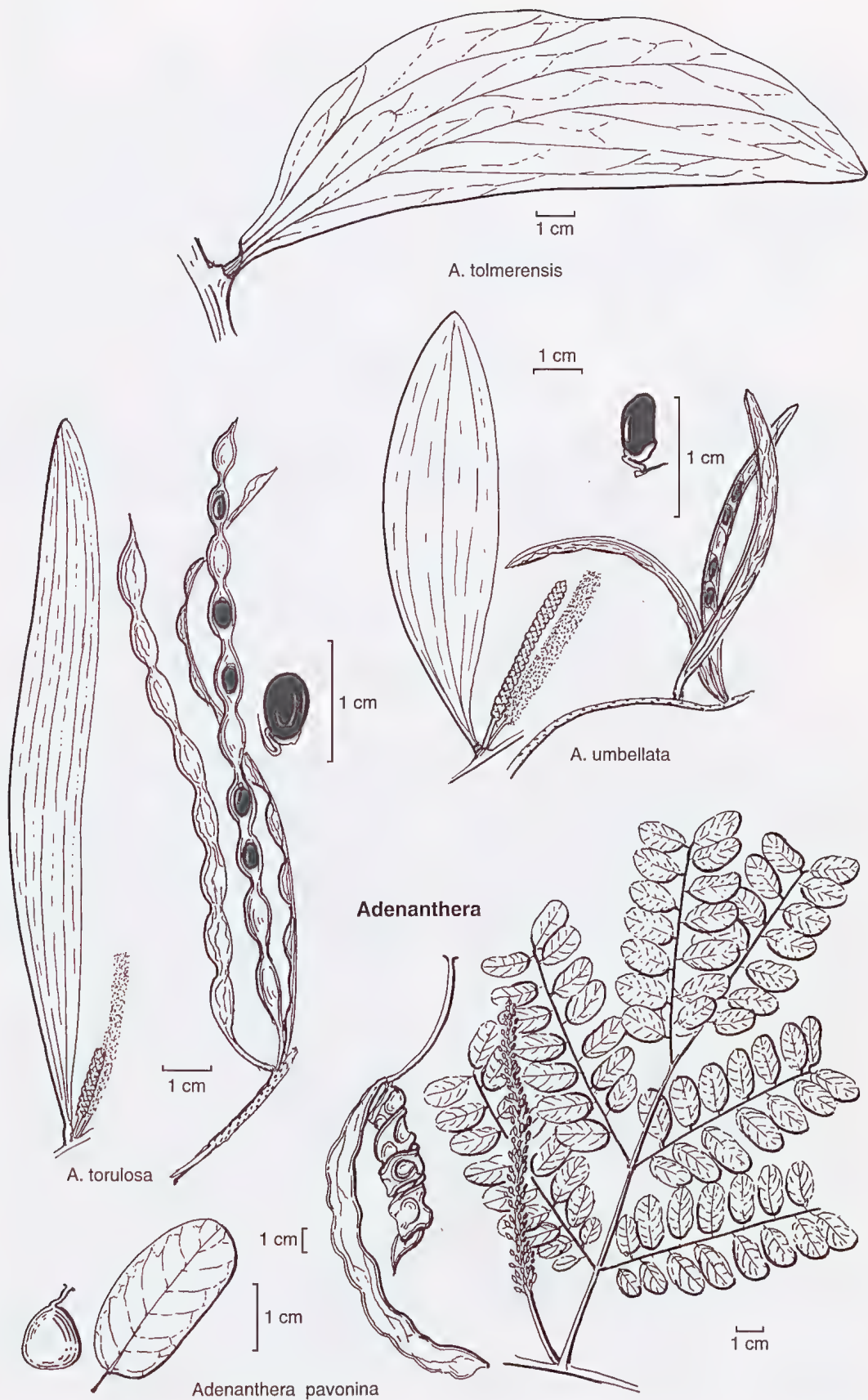


Fig. 10



leaflets; *leaflets* elliptic, 15-50 mm long, 8-25 mm wide, basal pair often much smaller, discoloured, sparsely hairy. *Inflorescence* a spike-like raceme, solitary, axillary, 170-210 mm long. *Flowers* cream to yellow on pedicels c. 4 mm long. *Calyx* c. 1 mm long, shallowly lobed, sparsely hairy. *Corolla* c. 4 mm long, glabrous, fused at base. Stamens more or less equal to corolla. Ovary hairy. *Pods* to 220 mm long, c. 16 mm wide, dark brown outside, yellowish within, twisting or coiling at

dehiscence. *Seeds* persistent, bright red, shiny, irregularly discoid, 8-10 mm diam. *Flowering*: Jan - Feb; fruiting: pods persist throughout the year. Fig. 10

#### Red Bead Tree

Top End and Qld and considered native. Also native to tropical Asia and Malesia and widely cultivated. Monsoon vine forest on a variety of substrates. Rare in the DR. The seeds are edible and also used for necklaces (Macmillan, 1991).

## ALBIZIA Durazz.

Trees or shrubs. Leaves bipinnate; petiole and rachis with glands. Inflorescence of heads or spikes (not in NT), solitary and axillary or in terminal panicles. Flowers hermaphrodite or male. Calyx (4)5(7)-lobed. Corolla (4)5(6)-lobed. Stamens many, usually 19-50; filaments basally united into a tube. Pods oblong, straight, flattened, mostly dehiscent, thin to almost woody.

A pantropic genus of 100-150 species with 3 species in the NT, 2 of which occur in the DR.

- |                                                                                                                                                                        |                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1. Leaflets with appressed hairs on both surfaces, 14-35 mm wide, apex apiculate;<br>inflorescence a terminal panicle; staminal filaments c. 15 mm long .....          | <b>A. canescens</b> |
| 1. Leaflets glabrous or hairs restricted to margin and mid vein, 9-14 mm wide, apex rounded;<br>inflorescence an axillary head; staminal filaments c. 30 mm long ..... | <b>A. lebbeck</b>   |

### A. canescens Benth.

*Tree* 7-10 m high. Bark yellowish to pale grey, deeply furrowed. Stipules caducous. Pulvinus 3-5 mm long, tomentose. *Leaf* rachis closely tomentose, (15)70-230 mm long with 1-5 pairs of pinnae; petiolar gland oblong, jugary glands absent, interjugary glands usually present; pinnae 40-155 mm long, 2-7 pairs of leaflets per pinnae; *leaflets* asymmetrically elliptic, 32-44 mm long, 14-35 mm wide, slightly discoloured, sericeous when young becoming sparsely so with age. *Inflorescence* a terminal panicle to 130 mm long. *Flowers* sessile in heads. *Calyx* campanulate, 2.5-3 mm long, irregularly lobed, hairy. *Corolla* c. 7 mm long, deeply lobed. *Staminal* filaments c. 15 mm long, creamy to white. *Pods* brown, 170-280 mm long, 30-40 mm wide, glabrous, valves thin. *Seeds* discoid, brown, c. 8.5 mm diam. *Flowering*: Sept; fruiting: June - Oct. Fig. 11

Across northern Australia, often associated with heavy soils and limestone. Uncommon in the southern part of the DR in the Daly River area.

### A. lebbeck (L.) Benth.

*Tree* 5-10(15) m high, deciduous. Bark yellowish-

brown to pale grey with prominent lenticels. Stipules caducous. Pulvinus 2.5-4 mm long, glabrous to slightly hairy. *Leaf* rachis glabrous or tomentose, 48-205 mm long with (1)2-3(6) pairs of pinnae; petiolar gland circular to oblong, 1-2 mm long, jugary and interjugary glands absent, small glands at nodes of terminal 4 pairs of leaflets; pinnae 25-150 mm long, (2)6-12 pairs of leaflets per pinnae; *leaflets* asymmetrically ovate, oblong or obovate, 18-37 mm long, 9-14 mm wide, basal pair often much smaller, discoloured, glabrous or sparsely hairy on margin and mid vein below. *Inflorescence* axillary, solitary heads; peduncle 15-80 mm long. *Flowers* pedicellate. *Calyx* cylindrical, 3 mm long, lobed, hairy. *Corolla* 7 mm long, deeply lobed. *Staminal* filaments c. 30 mm long; cream. *Pods* apparently indehiscent, stramineous, 160-230 mm long, 30-40 mm wide, glabrous, valves thin. *Seeds* discoid, pale brown, 9 mm long, 7 mm wide. *Flowering*: Sept - Oct; fruiting: June - Sept. Fig. 11

Across northern Australia and considered native. Also native to tropical Asia and cultivated pantropically. Coastal vine thickets on old dunes, laterite or basalt. Rare in the DR but commonly cultivated.

## CATHORMIUM (Benth.) Hassk.

A genus of c. 12 species from tropical America, Africa and Australia. Only 1 species in Australia.

### **C. umbellatum** (Vahl) Kosterm.

*Shrub* to tree, 3.5-10 m high with dense canopy. Bark dark grey to black, platy. Branchlets with prominent pale lenticels, sometimes spiny. Stipules caducous. Pulvinus 2 mm long. *Leaf* rachis 11-93 mm long with 1-3 pairs of pinnae, circular glands at junction of pinnae; pinnae 20-100 mm long, 3-7 pairs of leaflets per pinnae; *leaflets* asymmetrically obovate to elliptic, 21-43 mm long, 9-27 mm wide, discolorous, shiny glabrous above, dull glabrous or hairy below. *Inflorescence* a pedunculate, many-flowered umbel, mostly axillary, rarely terminal. Peduncle 30-50 mm long. Pedicel 4.5-9 mm long. *Calyx* cylindrical, toothed, 2.5 mm

long. *Corolla* deeply lobed, 5 mm long. *Stamens* numerous, to 12 mm long, filaments united basally. *Pods* curved to concertina'd, to 170 mm long, 18-25 mm wide, margin slightly indented to moniliform, breaking into indehiscent 1-seeded articles, dark or rusty velvety. *Seeds* dark brown, broadly oblong, 12 mm long, 10 mm wide. *Flowering*: Aug - Nov; fruiting: pods persisting throughout most of the year. Fig. 11

Widespread across coastal northern Australia. Also in Asia. Common in the DR on floodplains or rear of mangroves on heavy silty or clay soils. The Australian taxon is referable to subsp. *moniliforme* (DC.) Brummitt (Brummitt, 1970).

## DESMANTHUS Willd.

A genus of 25-30 species in tropical America. One introduced species in Australia.

### **\*D. virgatus** (L.) Willd.

Sprawling to erect perennial *shrub* to 2 m high. Stipules setaceous, 3-5 mm long. Pulvinus 1-3 mm long. *Leaf* rachis sparsely hairy, 9-40(70) mm long with 2-8 pairs of pinnae; gland 1, near basal pair of pinnae; pinnae 10-40 mm long with 11-31 pairs of leaflets; *leaflets* linear, 2-5 mm long, 0.5-0.7 mm wide, sparsely pubescent on margin. *Inflorescence* a globular head on solitary, axillary peduncles, 10-30 mm long. *Flowers* cream to white. *Calyx*

tubular, 5-toothed. *Corolla* 5-merous, petals free, valvate. *Stamens* 10. *Pods* brown, in dense clusters, linear, 27-60 mm long, 3-4 mm wide, glabrous, raised over seeds. *Seeds* 8-22, oblique in pod, angular rhomboid, brown with irregular rows of pale blisters, c. 3 mm long, c. 2 mm wide. *Flowering* and fruiting irregularly throughout the year. Fig. 11

A weedy species in disturbed coastal habitats from the Top End to Qld. Uncommon from scattered localities in the DR.

## ENTADA Adans.

A pantropical genus of c. 30 species, through Africa, Madagascar, Asia, China, Malesia, northern Australia to America. One species in the NT.

### **E. rheedii** Sprengel

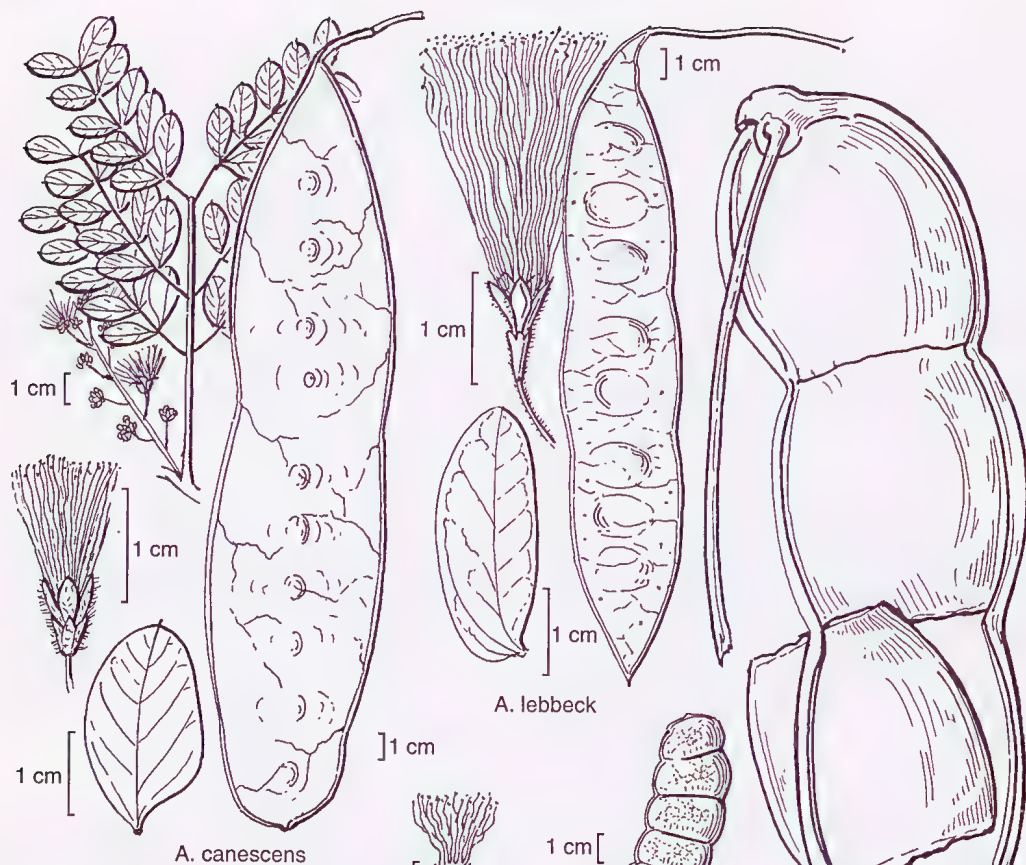
*E. pursaetha* DC.

Woody *liane*. Stipules not evident. Pulvinus c. 6 mm long. *Leaf* rachis glabrous, 55-70 mm long, ending in a forked tendril 50-80 mm long, with 2 pairs of pinnae. Glands absent; pinnae 60-100 mm long, *leaflets* in 3-4 pairs, elliptic, 32-55 mm long, 17-27 mm wide, shiny above, dull below, glabrous.

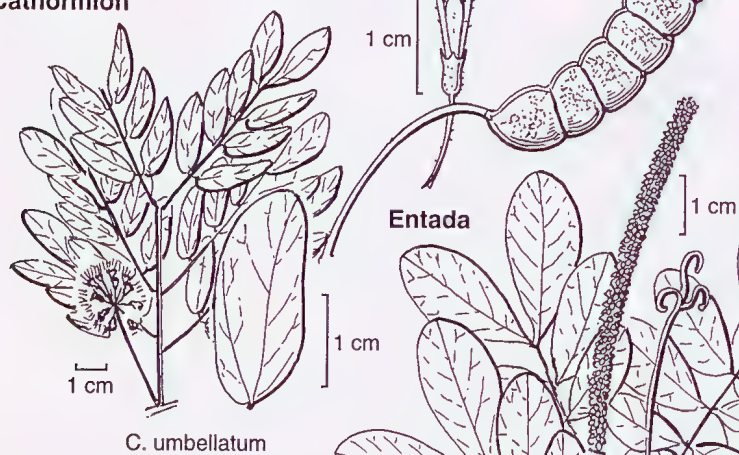
*Inflorescence* an axillary, solitary spike, 90-120 mm long on glabrous peduncles 24-28 mm long; rachis sparsely hairy. *Flowers* hermaphrodite or male in lower part of spike; greenish yellow. *Calyx* 5-lobed, minute. *Petals* 5, 2 mm long. *Stamens* 10, adnate to tube at base, 5 mm long. *Pods* woody, more or less straight, to 2 m long, 75 mm wide, indehiscent, 1-seeded articles breaking away from woody margins.



# **Albizia**



## **Cathormion**



## **Desmanthus**

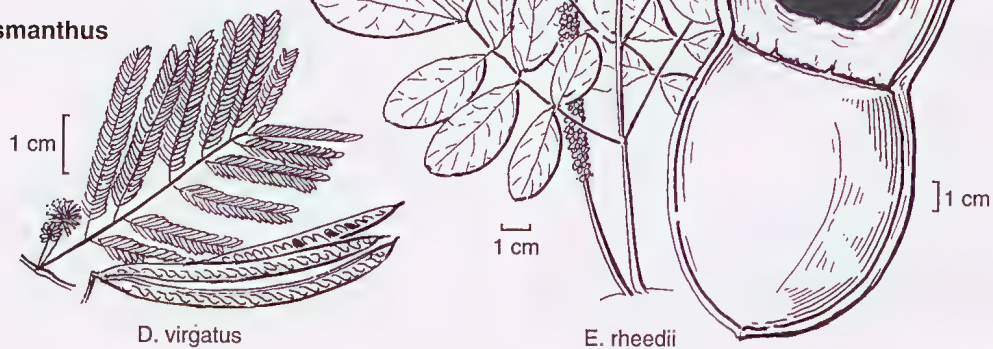


**Fig. 11**

*Seeds* discoid, somewhat angular, brown, smooth, shiny, 40 mm diam., 20 mm thick. *Flowering*: Apr; fruiting: pods persistent. Fig. 11 **Matchbox Bean**  
Widespread through Africa, India, China,

Philippines to northern Australia. Coastal rainforest. Rare in the DR where known only from Melville Island. The seeds are distributed in their articles and are often seen washed up on the seashore.

## LEUCAENA Benth.

A genus of about 50 species from tropical America. One species widely cultivated and naturalised throughout the tropics.

### \**L. leucocephala* (Lam.) De Wit

*Shrub* to small tree to 6 m. Bark smooth with prominent lenticels. Vegetative parts minutely tomentose. Stipules c. 1 mm long. Pulvinus c. 3 mm long. *Leaf* rachis 45-125 mm long, with 3-9 pairs of pinnae; prominent dark gland at basal pair of pinnae, rarely additional gland at terminal pair; pinnae 22-75 mm long with 8-22 pairs of leaflets; *leaflets* asymmetrically narrowly oblong, 5-15 mm long, 1-4 mm wide, discolorous. *Inflorescence* a solitary or paired globular head on peduncles 17-35 mm long. Head 18-20 mm

diam., creamy yellow. *Calyx* 5-toothed, 3 mm long. *Petals* 5, free, 5 mm long. *Stamens* 10, 7-8 mm long. *Pods* long-stipitate, oblong, clustered, pale brown, 90-150 mm long, 15-19 mm wide, glabrescent, valves thin. *Seeds* 14-21, transverse in pod, obovoid, shiny, brown, 5-8 mm long, 4-5 mm wide, *Flowering* and fruiting all year. Fig. 12 **Coffee Bush**

Pantropical. Common weed in suburban Darwin. Utilised in many tropical countries as shade for coffee, as a source of fuelwood and fodder and to reafforest eroded land (Nat. Acad. Sc., 1979).

## MIMOSA L.

Herbs, shrubs or rarely trees, mostly prickly. Leaves bipinnate or in a few species (not NT) absent or modified into phyllodes, sensitive to touch. Flowers hermaphrodite or male, in subglobose or spicate heads which are axillary, solitary or clustered. Calyx 3-6-lobed. Stamens as many as or twice as many as corolla lobes. Pods straight to coiled, flat, mostly breaking to form tardily dehiscent 1-seeded articles, falling from the persistent margin.

A large genus of 450-500 species, predominantly American with 2 introduced species in the NT.

- |                                                                                                                  |                  |
|------------------------------------------------------------------------------------------------------------------|------------------|
| 1. Leaves without prickles on petiole and rachis; pinnae in 1-2 digitate pairs;<br>prostrate or low shrubs ..... | <b>M. pudica</b> |
| 1. Leaves more or less prickly on petiole and rachis; pinnae in 9-14 pairs,<br>not digitate; shrub to 4 m .....  | <b>M. pigra</b>  |

### \**M. pigra* L.

*Shrub* to 4 m high with prickly stems and leaves; vegetative parts scabrid with antrorsely appressed bulbous-based bristles. Stipules narrow-triangular, 3-5 mm long. Pulvinus 5-7 mm long. *Leaf* rachis 125-220 mm long with 9-14 pairs of pinnae, sometimes subopposite, often with a spine at each junction; glands absent; pinnae 30-60 mm long with 42-44 pairs of leaflets; *leaflets* linear, 3-8 mm long, to c. 1 mm wide. *Inflorescence* of solitary or paired axillary heads; peduncle 15-35 mm long. Heads

globular to slightly elongated, purplish to pink, 10 mm diam. *Calyx* minute. *Petals* 4. *Stamens* 8. *Pods* clustered, brown, 50-80 mm long, 8-10 mm wide, densely hairy with rusty bristles. *Seeds* 20-25, transverse in pod, grey to olivaceous, oblong, 4-5 mm long, 2-3 mm wide. *Flowering*: July - Feb; fruiting: Feb - July. Fig. 12 **Mimosa**

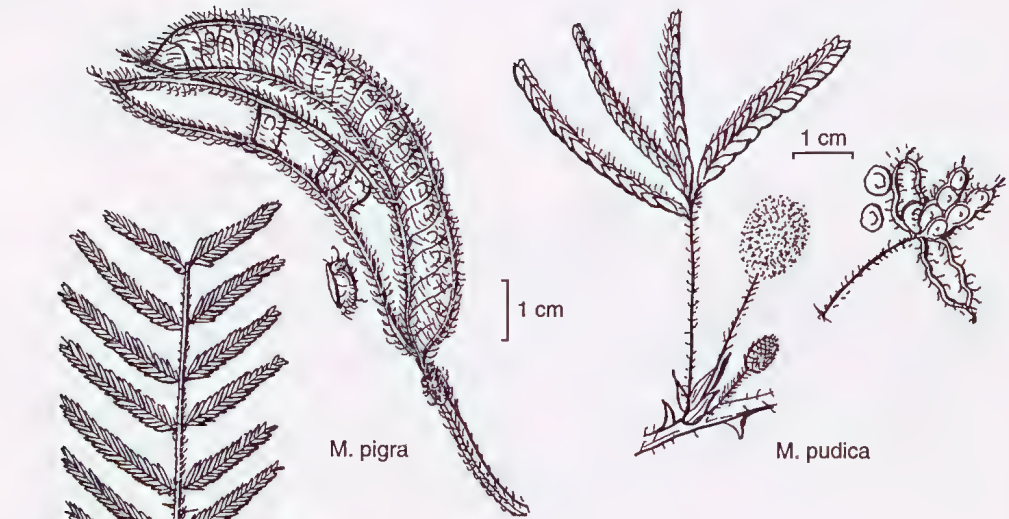
Widespread in tropical Africa and America. Introduced throughout Asia. Common in the DR in coastal freshwater swampy situations. First introduced in the DR at the Darwin Botanic Gardens last century



**Leucaena**



**Mimosa**



**Neptunia**

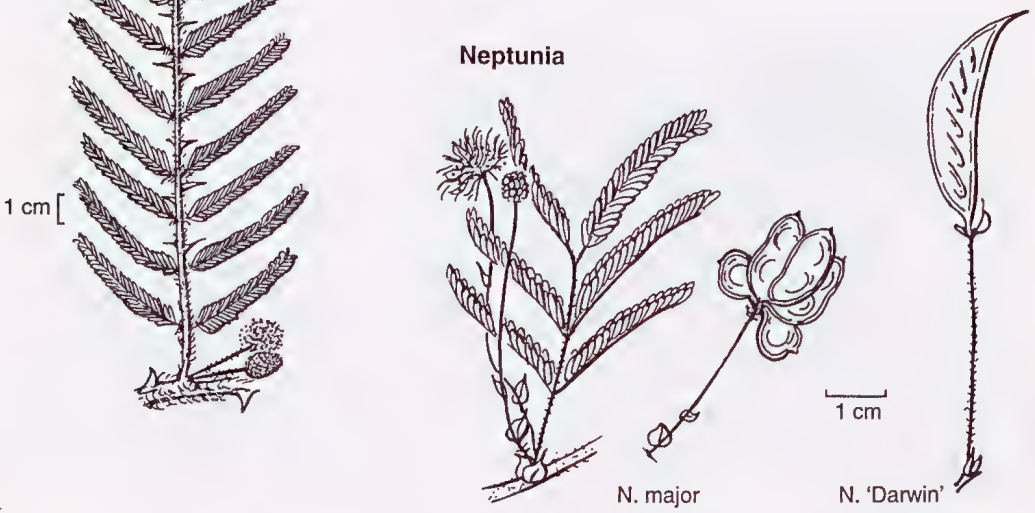


**Fig. 12**

from where it has spread to become one of the worst weeds in the NT.

**\*M. pudica L.**

Trailing *herb* to erect shrub to 1.2 m high; vegetative parts sparsely to densely pilose with sparse prickles on stems. Stipules narrow-triangular, 5-12 mm long. Pulvinus 2-3 mm long. *Leaf* rachis 15-42 mm long with 1-2 pairs of digitate pinnae; glands absent; pinnae 20-40 mm long with 10-24 pairs of

leaflets; *leaflets* linear to narrowly oblanceolate, 4-12 mm long, 1.5-3 mm wide. *Inflorescence* of 1-3 axillary heads on peduncles 15-38 mm long. Heads subglobular, 8 mm diam., mauve to pink. *Calyx* minute. *Petals* 4. *Stamens* 4. *Pods* clustered, brown, 10-16 mm long, c. 4 mm wide, margins conspicuously bristly. *Seeds* 2-3, brown, discoid, 3 mm long. *Flowering*: Dec - Apr; *fruiting*: June. Fig. 12

Probably native of South America. An uncommon weed in the DR in disturbed habitats.

## NEPTUNIA Lour.

Aquatic or terrestrial unarmed herbs. Leaves bipinnate. Flowers in globose to ellipsoid solitary axillary heads; upper flowers hermaphrodite, lower ones male or neuter. *Calyx* 5-toothed. *Petals* 5. *Stamens* 5 or 10 (not in Australia), free. *Pods* clustered, thin to thick, oblong to more or less round, compressed, straight.

A widely distributed mainly tropical genus of 11 species; 4 species found in the NT with two in the DR. [Windler, 1966].

- |                                                                                                                                        |                    |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1. Plants erect, glabrous; petiolar gland present; pods <25 mm long, in dense clusters .....                                           | <b>N. major</b>    |
| 1. Plants prostrate, pubescent or rarely glabrous; petiolar gland absent; pods >25 mm long, typically only one per head maturing ..... | <b>N. 'Darwin'</b> |

### N. major (Benth.) Windler

Annual *shrub*, 0.6-2 m high, glabrous. Stipules mostly caducous, lanceolate, c. 2-3.5 mm long. Pulvinus 1-2 mm long. *Leaf* rachis (7)14-52 mm long with 1-3 pairs of pinnae; petiolar gland present; pinnae 32-80 mm long, stipels absent, 15-36 pairs of leaflets per pinnae; *leaflets* linear-oblong, 6-11 mm long, 1.5-2 mm wide, slightly discoloured, sensitive to touch. Heads on peduncles 32-50 mm long with 1-2 ovate cordate bracts. *Calyx* 1.8- 2 mm long. *Petals* 2.8-3.2 mm long. *Stamens* c. 5 mm long, filaments slender, flattened, anthers with terminal gland; lower sterile flowers with 5 petal-like, yellow staminodes, 7-9.5 mm long. *Pods* in dense clusters, broadly oblong, flat, 10-20 mm long, 8-11 mm wide, glabrous, valves thin. *Seeds* 1-3, obovoid, 4 mm long, 3-4 mm wide. *Flowering*: unknown; *fruiting*: Jan - June. Fig. 12

Top End and the Kimberley on black soil. Rare in DR on coastal plains. Flowers not seen, description taken from Windler.

### N. 'Darwin'

Prostrate *shrub* with perennial rootstock and typically annual stems to c. 50 cm long; vegetative parts hairy throughout, rarely glabrous. Stipules persistent, lanceolate, acuminate, 3-6.5 mm long. Pulvinus 2-3 mm long. *Leaf* rachis 6-26(75) mm long with 1-4(6) pairs of pinnae; glands absent; pinnae 10-40 mm long, stipels present, 10-24 pairs of leaflets per pinnae; *leaflets* linear-oblong, 4-7 mm long, 1-2 mm wide, slightly discoloured, sensitive to touch. Heads yellow, on peduncles 21-55 mm long with 1-2 subulate, caducous bracts. *Calyx* 3 mm long. *Corolla* 4 mm long. *Stamens* 6 mm long; filaments filiform; anthers with red stipitate apical gland; lower sterile flowers with 5 flattened staminodes, 6-9 mm long. *Pods* 1, rarely 2 per head, oblong, flat, 25-35 mm long, 8-10 mm wide, glabrous, valves thin. *Seeds* 5-8, discoid, 3.5 mm diam. *Flowering*: throughout the year; *fruiting*: Jan - Apr. Fig. 12

Known from widespread localities in the Top End on sandy or lateritic soils.



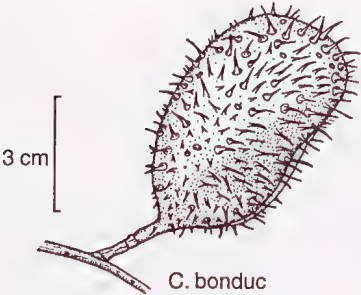
## CAESALPINIACEAE

Trees, shrubs or herbs, sometimes spiny. Stipules present; stipellae absent. Leaves alternate, compound or rarely simple. Flowers generally perfect, mostly zygomorphic. Hypanthium sometimes present. Sepals mostly 5, rarely 4, free or partly united, imbricate or rarely valvate. Petals 5 rarely fewer, often unequal, clawed, imbricate. Stamens 10 or fewer, free or rarely connate (in *Tamarindus*), sometimes some of them staminodial, alike or variously heteromorphic; anthers basifixed or dorsifixed, opening lengthwise or by apical pores. Ovary superior, usually stipitate; carpel 1, unilocular; a single style and stigma. Fruit a legume, mostly dry, dehiscent or indehiscent.

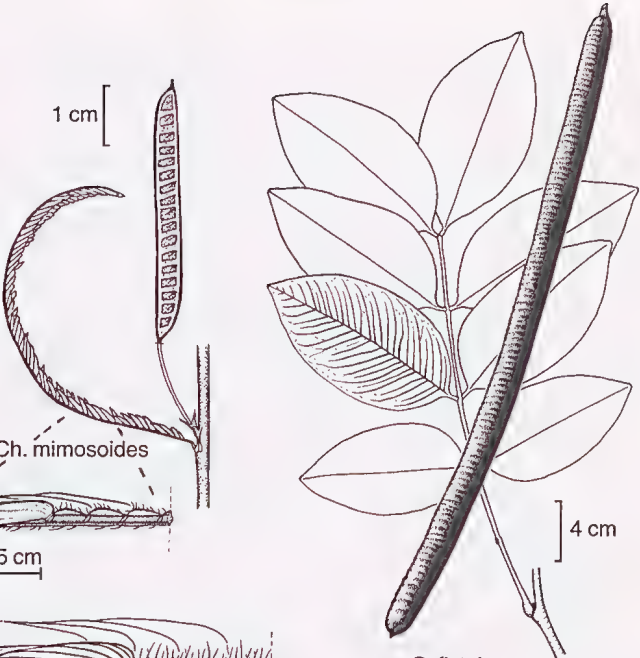
A family of 150 genera, 2200 species; widespread in tropical and subtropical regions. In Australia 23 genera with 15 genera in the NT; 11 recorded for the DR, 4 of which are introduced. [Brenan, 1967; Verdcourt, 1979]

- |                                                                                                                |                      |
|----------------------------------------------------------------------------------------------------------------|----------------------|
| 1. Leaves apparently simple, of 2 equal lobes .....                                                            | <b>Piliostigma</b>   |
| 1. Leaves compound .....                                                                                       | <b>2</b>             |
| 2. Leaves with 2 leaflets .....                                                                                | <b>3</b>             |
| 2. Leaves with >2 leaflets .....                                                                               | <b>4</b>             |
| 3. Herb; stipules broad, cordate .....                                                                         | <b>Chamaecrista</b>  |
| 3. Shrubs or trees; stipules minute .....                                                                      | <b>Lysiphyllum</b>   |
| 4. Spinescent shrubs .....                                                                                     | <b>5</b>             |
| 4. Unarmed herbs, shrubs or trees .....                                                                        | <b>6</b>             |
| 5. Leaflets alternate, >50 per pinna; pod smooth .....                                                         | <b>Parkinsonia</b>   |
| 5. Leaflets opposite, 6-10 pairs per pinna; pod spiny .....                                                    | <b>Caesalpinia</b>   |
| 6. Leaves bipinnate .....                                                                                      | <b>7</b>             |
| 6. Leaves pinnate .....                                                                                        | <b>9</b>             |
| 7. Leaves with 1-3 pairs of pinnae; leaflets <10, alternate .....                                              | <b>Erythrophleum</b> |
| 7. Leaves with >6 pairs of pinnae; leaflets >18, opposite .....                                                | <b>8</b>             |
| 8. Flowers yellow; tomentum of foliage and inflorescence rusty;<br>pod indehiscent, to 100 mm long .....       | <b>Peltophorum</b>   |
| 8. Flowers red; tomentum of foliage and inflorescence white or hyaline;<br>pod dehiscent, >300 mm long .....   | <b>Delonix</b>       |
| 9. Leaflets >100 mm long; pods cylindrical, indehiscent, >150 mm long .....                                    | <b>Cassia</b>        |
| 9. Leaflets <100 mm long; pods dehiscent or if indehiscent then <150 mm long .....                             | <b>10</b>            |
| 10. Perfect stamens 3; pod indehiscent; seeds immersed in fleshy pulp .....                                    | <b>Tamarindus</b>    |
| 10. Perfect stamens more than 3; pod dehiscent; seeds not immersed in fleshy pulp .....                        | <b>11</b>            |
| 11. Pod valves twisting after dehiscence; bracteoles present;<br>androecium not bilaterally symmetrical .....  | <b>Chamaecrista</b>  |
| 11. Pod valves remaining flat after dehiscence; bracteoles absent;<br>androecium bilaterally symmetrical ..... | <b>Senna</b>         |

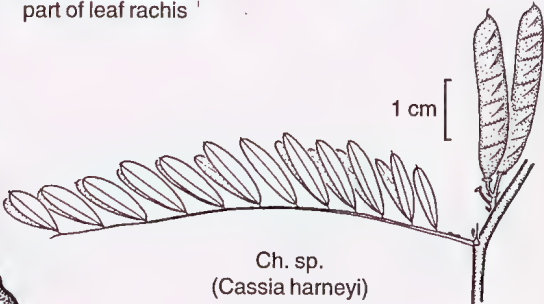
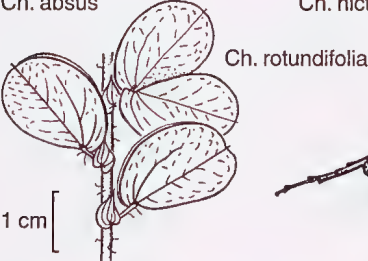
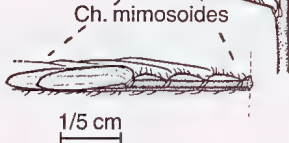
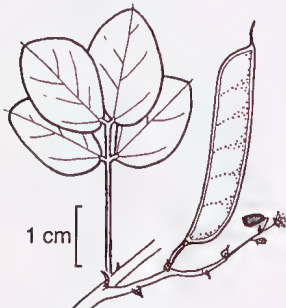
**Caesalpinia**



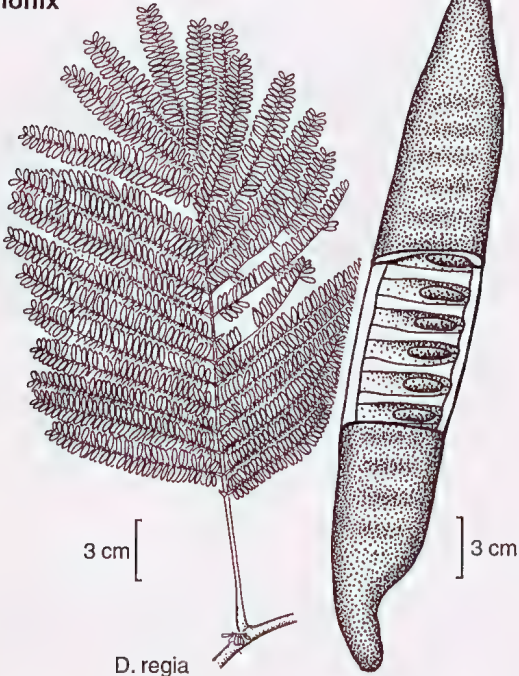
**Cassia**



**Chamaecrista**



**Delonix**



**Erythrophleum**

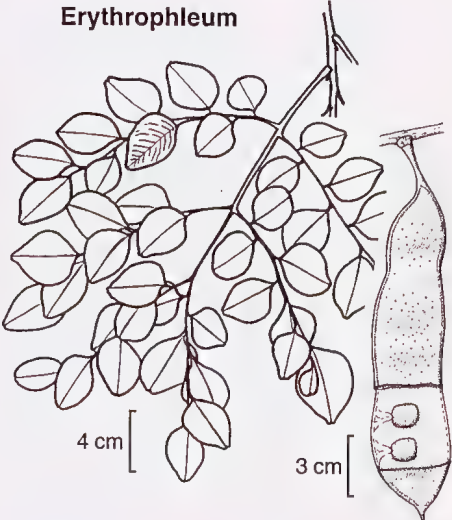


Fig. 13



## CAESALPINIA L.

A predominantly New World genus of c. 200 species; 11 species in Australia, 1 in the NT.

### **C. bonduc (L.) Roxb.**

Evergreen scrambler or *shrub* to 3 m; vegetative parts with rusty or silvery puberulous hairs, leaflets sometimes glabrous except for margins and main veins. *Stipules* persistent, foliaceous, irregularly divided, to 17 mm long. *Leaves* bipinnate, terminated by a bristle or a pinna, pinnae and leaflets subtended by stout, recurved spines which are also scattered on rachis, rachis 150-630 mm long; pinnae 4-11 pairs, 55-150 mm long and terminated by a bristle; 6-10 pairs of leaflets per pinna; *leaflets* 6-10 pairs per pinna, discolorous, oblong, ovate or elliptic, asymmetric, 15-48 mm long, 9-23 mm wide, L/W 1.3-2.5, apiculate. *Inflorescence* of axillary or terminal racemes to 320 mm long; pedicels 3-4 mm long; bracts caducous, narrowly elliptic, to 10 mm long; bracteoles absent. *Flowers* hermaphrodite or male. Hypanthium c. 2 mm long. *Sepals* 5, unequal,

oblong to oblanceolate, 6-10 mm long, densely puberulous, minute clavate hairs on margin. *Petals* 5, cream to yellow, one slightly different in size and shape, spatulate, claw densely hairy, limb glabrous, reflexed, 5.5-11 mm long. *Stamens* 10, free, alternating long and short; filament pilose in basal half; anthers versatile. *Ovary* stipitate, hairy; ovules 2; style stout, c. 3 mm long, hairy; stigma sunken into style and surrounded by a ring of hairs. *Pods* brown, stipitate, echinate, inflated, tardily dehiscent, broadly oblong, 48-80 x 30-45 mm, style persistent. *Seeds* 2, grey, often with pale bands, globular, 16-20 mm diam., hard, ecarunculate. *Flowering*: Jan - Apr; fruits persisting for most of the year. Fig. 13

Pantropic and common in the DR. The fruits and seeds are buoyant and water dispersed. Grows on beaches above high tide.

## CASSIA L.

A circumtropical genus which in the restricted sense of the genus has only about 30 species. One introduced species in the Top End. [Randell, 1988]

### **\*C. fistula L.**

Deciduous *tree* to 10 m; glabrous or almost so; bark smooth, pale. *Stipules* setaceous, 2 mm long. *Leaves* paripinnate, rachis 160-265 mm long; stipellae absent; *leaflets* 3-5 pairs, discolorous, elliptic or ovate, 100-210 mm long, 50-90 mm wide, L/W 1.75-2.3. *Inflorescence* of pendulous, axillary racemes, to 380 mm long. Bracts caducous, linear-lanceolate, 7 mm long; bracteoles at base of peduncle, caducous. Peduncle 28-40 mm long; pedicel c. 2 mm long. *Sepals* 5, equal, free, ovate to obovate, 6.5-9 mm long. *Petals* 5, equal, free, shortly clawed, yellow, elliptic to obovate, 17-21 mm long. *Stamens* 10,

free, of varying length, opening by longitudinal slits. *Ovary* stipitate, slightly hairy; ovules numerous; style short, stout; stigma vaginate. *Pods* dark brown, cylindrical, indehiscent, woody, on stipe c. 10 mm long, to 470 mm long, 20-25 mm diam. *Seeds* numerous, transverse, discoid, c. 20 mm diam., enveloped by sticky brown aromatic pulp. *Flowering*: late Dry season; fruits persisting throughout year. Fig. 13 **Golden Shower, Golden Rain Tree**

Native to India and Sri Lanka. Widely planted and persisting at abandoned sites. In the DR naturalised at Channel Island. The edible pulp around the seeds has purgative properties (Macmillan, 1991).

## CHAMAECRISTA Moench

Annual forbs or shrubs. *Stipules* striate, persistent, narrow-triangular. *Leaves* pinnate, terminated by a bristle. Bracts and bracteoles persistent. *Sepals* 5, free. *Petals* 5, clawed, free, yellow, often drying reddish. *Stamens* free, stout, unequal; anthers c. equal to filament or longer, opening by terminal pores, ultimately

opening lengthwise along ciliolate suture. Ovary hairy, sessile; ovules numerous; style short; stigma sunken, truncate or vaginate. Pods flattened, dehiscent, valves twisted after dehiscence, oblong, thinly coriaceous. Seeds oblique in pod, ecarunculate, obscurely banded with pale spots or stripes.

About 250 species, mostly in the neotropics but also in Africa, tropical Asia and Australia. Six species in the NT, 4 of which occur in the DR. *C. rotundifolia* has been rarely collected as an introduced weed. It does not appear to be naturalised in the DR but is included in the key and illustrations. [Randell, 1988]

- |    |                                                                                                  |                                       |
|----|--------------------------------------------------------------------------------------------------|---------------------------------------|
| 1. | Leaflets 1-2 pairs .....                                                                         | 4                                     |
| 1. | Leaflets >2 pairs .....                                                                          | 2                                     |
| 2. | Leaflets <13 pairs, 7-25 mm long .....                                                           | <b>C. sp. (<i>Cassia harneyi</i>)</b> |
| 2. | Leaflets in numerous pairs, typically >25 pairs, up to 11 mm long but usually much less .....    | 3                                     |
| 3. | Leaf rachis margin expanded between leaflet pairs into a rounded wing .....                      | <b>C. mimosoides</b>                  |
| 3. | Leaf rachis without expanded wing but densely ciliate with patent hairs between leaf pairs ..... | <b>C. nictitans</b>                   |
| 4. | Leaflets 1 pair .....                                                                            | <b>C. rotundifolia</b>                |
| 4. | Leaflets 2 pairs .....                                                                           | <b>C. absus</b>                       |

### **C. absus (L.) Irwin & Barneby**

*Cassia absus* L.

Erect, viscid *annual* to 1 m high; tomentose with short simple hairs, in addition stems, rachis, inflorescence and pods with long septate glandular-based hairs. *Stipules* 2.5-6 mm long. *Leaves* 4-foliolate, rachis 16-63 mm long, stipellae caducous; *leaflets* elliptic to obovate, asymmetric, 10-52 mm long, 6-30 mm wide, L/W 1.1-1.9, minutely apiculate. *Inflorescence* a terminal, leaf-opposed and apparently axillary raceme to 125 mm long. Bracts broadly ovate, cordate, 1.5-2 mm long. Pedicels 3-8 mm long. *Sepals* subequal, narrow-elliptic, 4-5.5 mm long. *Petals* clawed, spatulate, 5-8.5 mm long. *Stamens* 4-7. *Ovary* with 5-8 ovules; stigma vaginate. *Pods* brown, 25-44 mm long, 5.5-8 mm wide, reticulately veined, base and apex asymmetric, margin with dense tomentum of short curved simple hairs, otherwise with scattered short and long glandular-based hairs. *Seeds* 5-7, shiny dark brown, quadrate to obovate, oblique, 4-5 mm long, 2.3-3.5 mm wide. *Flowering* and fruiting: Jan - July. Fig. 13

Widespread in the Old World tropics and across northern Australia; uncommon in the DR with records from Batchelor and Tipperary. Associated with disturbed sites on a variety of soil types.

### **C. mimosoides (L.) Greene**

*Cassia mimosoides* L.

Erect *annual forb* or subshrub, rarely to 1 m. Indumentum of simple, short, pale yellowish hairs. *Stipules* 2.5-7.5 mm long. *Leaves* sensitive, (15)40-85 pairs of leaflets, sometimes with 1-2 basal glands

below basal pair, rachis (17)40-110 mm long, between leaflet pairs with shallowly rounded, often ciliate wing, stipellae absent; *leaflets* imbricate, linear-oblong, asymmetric, apiculate, 1.5-5 mm long, 0.4-1 mm wide, L/W 2.5-6.2. *Inflorescence* supra-axillary, usually 1-flowered. Pedicels 10-19 mm long. *Sepals* lanceolate, 4-6.5 mm long, subequal. *Petals* obovate, 4-7.5 mm long, sometimes with minute scales at base. *Stamens* 8-10. Ovules c. 12; stigma truncate with ring of hairs. *Pods* brown, (28)38-53 mm long, 4-4.7 mm wide. *Seeds* 13-18, pale brown to brown, obovate to oblong or quadrate, 2.5-3.8 mm long, 1.6-2.2 mm wide. *Flowering* and fruiting: June - July. Fig. 13

Widespread in the tropics of the Old World and across northern Australia. Common in the DR, favouring disturbed habitats in poorly drained sandy soils.

### **C. nictitans (L.) Moench**

*C. lechenaultiana* (DC.) Degener

Erect *forb*, annual or perennial with annual aerial parts, to 60 cm high rarely to 1 m. Indumentum of simple, short, yellowish hairs, recurved on stems and inflorescence, patent on leaf rachis and rarely pedicels. *Stipules* 5-9 mm long. *Leaves* sensitive, (10)26-73 pairs of leaflets, usually with gland below basal pair, rachis 23-110 mm long; *leaflets* imbricate, linear-oblong, asymmetric, apiculate, 3-11 mm long, 0.7-2.2 mm wide, L/W 3-6.8. *Inflorescence* supra-axillary, 1-2-flowered. Pedicels 5-15 mm long. *Sepals* lanceolate, 6-10 mm long, subequal. *Petals* obovate, 7-11.5 mm long, sometimes with minute



scales at base. *Stamens* 9. Ovules to 25; stigma truncate with ring of hairs. *Pods* brown, 45-65 mm long, 3.5-5 mm wide. *Seeds* 13-22, brown, oblong-quadrate, 2.1-3 mm long, 1.4-2.1 mm wide. *Flowering* and fruiting: Jan - May. Fig. 13

Pantropic and across northern Australia; scattered in the DR in open woodland, usually on skeletal soils. Previously confused with *C. mimosoides*. Appears to be native in Australia.

**C. sp. [*Cassia harneyi* Specht]**

Erect *annual* to 1 m with zig-zag stems. Indumentum throughout of simple curved yellow hairs. *Stipules* 2-4 mm long. *Leaves* sometimes with sessile glands at base of rachis or between terminal or subterminal pairs of leaflets, rachis length 40-85 mm long, stipellae absent; *leaflets* 6-13 pairs,

narrowly oblong or narrow-oblongate, slightly asymmetric, 7-25 mm long, 1.3-5.5 mm wide, L/W 4.5-7, apiculate. *Inflorescence* supra-axillary, contracted, few-flowered. Bracts and bracteoles c. 1-2 mm long. Pedicels 2-3 mm long. *Sepals* equal, oblanceolate, 2.7-3.8 mm long. *Petals* shortly clawed, obovate, 4-5 mm long, sometimes with minute scales at base. *Stamens* 10. *Pods* dark brown, 20-30 mm long, 3.5-5 mm wide. *Seeds* 4-7, dull brown, obovate, oblique, c. 3.5 x 2.5 mm. *Flowering* and fruiting: Mar - Aug. Fig. 13

Africa, India to Arabia and in Australia from Cape York and the Top End. Rare in the DR where known only from Mt Bunday. Typically associated with open habitats on sandstone but also on granite.

Probably conspecific with *C. nigricans* (Vahl) Standl. (L. Pedley pers. comm.). Currently known as *Cassia harneyi*.

## DELONIX Raf.

A genus of c. 8 species from Madagascar, Africa to India. One species introduced in Australia.

**\*D. regia (Boj. ex Hook.) Raf.**

*Poinciana regia* Boj. ex Hook.

Deciduous *tree* to 10 m; bark smooth, pale. Indumentum shortly tomentose on underside of leaflets, leaf rachis, bases of the petals, staminal filaments and ovary. *Stipules* caducous, foliaceous, pinnate, c. 7 mm long. *Leaves* bipinnate, terminated by caducous bristle, rachis 160-300 mm long; pinnae 9-18 pairs, 45-80 mm long; 15-26 leaflet pairs per pinna; *leaflets* 15-26 pairs per pinna, discolorous, oblong, 5-13 mm long, 2-4.5 mm wide, L/W 2.5-3. *Inflorescence* an axillary raceme to 250 mm long. Bracts ovate, c. 3.5 mm long. Pedicels 35-75 mm long. *Flowers* zygomorphic. *Sepals* red outside, yellow inside, 5, equal, thick, oblong, valvate, 30-35 mm long. *Petals* red, 1 red and yellow, 5, free, long-clawed, limb ±

orbicular, slightly broader than long, red, 55-65 mm long. *Stamens* 10, of variable length, hairy at base; anthers basifixed, versatile. *Ovary* ± sessile; ovules numerous; style long, glabrous; stigma terminal, truncate, hairy. *Pods* brown, dehiscent, woody, flattened, straight or slightly curved, oblong, 20-40-seeded, 300-600 mm long, 40-50 mm wide. *Seeds* brown with pale margins and mottled, narrowly elliptic to oblong, 19-20 mm long, 7-8 mm wide. *Flowering*: Nov - Dec; fruits persisting throughout year. Fig. 13 **Poinciana, Orange Flame Tree**

Originally from Madagascar, now widely cultivated throughout the tropics. In the DR naturalised and common at East Point, Channel Island and abandoned settlements.

## ERYTHROPHLEUM R. Br.

A genus of 10 species from Africa, Madagascar, Asia and Australia; 1 species endemic in tropical Australia.

**E. chlorostachys (F. Muell.) Baillon**

Evergreen or deciduous *trees* to 15 m high; bark corky in young trees, becoming dark grey, hard and tessellated at length; glabrescent or glabrous, hairs

simple. *Stipules* minute, caducous. *Leaves* bipinnate, rachis 75-190 mm long, pinnae in 1-3 opposite pairs, 65-190 mm long, terminating in a leaflet; *leaflets* on petiolules 2.5-10 mm long, alternate, 1-9 per pinna,

slightly discoloured, leathery, asymmetric, ovate to orbicular, 25-85 mm long, 20-75 mm wide, L/W 0.8-1.6, apex rounded or emarginate. *Inflorescence* usually on current seasons growth, of axillary panicles or spikes to 130 mm long. Bracts small, caducous; bracteoles absent. *Flowers* sessile,  $\pm$  actinomorphic, greenish-white. Hypanthium c. 1 mm long. *Calyx* 1.5-2 mm long, lobes 5, c. 2/3 of total length; lobes rounded and fimbriate. *Petals* 5, free, oblanceolate, 2.5-4 mm long, margins fimbriate. *Stamens* 10, free, exserted, the filament bases unequally thickened; filaments alternately long and short; anthers dorsifixed, versatile, thecae straight, opening by longitudinal slits, apex with a gland-like tip. *Gynoecium* long (exserted) or short (included). *Ovary* stipitate, white-hirsute throughout; ovules 6-8; stigma minute. *Pods* on stipe c. 20 mm long, dark brown, sub-woody, dehiscent, flat, oblong, straight, 115-165 mm long, 24-43 mm wide, 4-8-seeded. Funicle long, flattened. *Seeds* transverse in pod, brown, often scurfy,

flattened ellipsoid, 10-12 mm long, 9-12 mm wide. *Flowering*: Sept - Dec; fruit available most months, peaking June - July. Fig. 13 **Ironwood**

Common in the DR, occurring in most vegetation types on a variety of soil types excluding heavy clays. On skeletal soils Ironwood may be leafless during the Dry season. The species is a prolific root sucker.

A species well known to the pastoral industry as poisonous to all types of stock (Everist, 1979). The timber is extremely hard, dense and durable and is reasonably resistant to termite attack. It has been used for building, fence posts, railway sleepers, crafts, firewood, etc. Ironwood is used extensively by Aborigines for medicinal purposes (Scarlett *et al.*, 1982; Abor. Comm. NT, 1988) and for ceremonial and utilitarian artifacts (Levitt, 1981). The extruded gum on the bark is eaten raw (Wightman, unpub.). The bark yields a red dye (Wightman *et al.*, 1992).

## LYSIPHYLLUM (Benth.) de Wit

Evergreen or briefly deciduous trees, shrubs or scramblers. Tomentum of simple hairs. Stipules minute, caducous. Leaves pinnately 2-foliolate, the rachis ending in a bristle; leaflets asymmetric, venation palmate. Inflorescence racemose. Bracts and bracteoles minute, caducous. Hypanthium present. Calyx 5-partite. Petals 5, free, clawed. Stamens 10, exsert; anthers dorsifixed, versatile, dehiscing by longitudinal slits. Ovary stipitate, the stipe adhering to one side of the hypanthium; style curved, glabrous; stigma capitate. Pods dehiscent or indehiscent, flat, oblong, straight. Seeds flattened, elliptic.

A genus of 7 species of the Old World tropics and subtropics; 5 species in Australia, 3 in the NT and 2 in the DR.

*Lysiphyllum* (and *Piliostigma*) is a satellite genus of *Bauhinia*; the latter in its strict sense does not occur in Australia (de Wit, 1956). The characters which distinguish *Lysiphyllum* from related genera include: leaves of two free leaflets; hypanthium (receptacle) narrow; fertile stamens 10; stipe of ovary adhering to one side of hypanthium; stigma large, capitate.

- |                                                                          |                        |
|--------------------------------------------------------------------------|------------------------|
| 1. Shrub or scrambler; leaflets broader than long; pod indehiscent ..... | <b>L. binatum</b>      |
| 1. Tree; leaflets longer than broad; pod dehiscent .....                 | <b>L. cunninghamii</b> |

### **L. binatum** (Blanco) de Wit

*Bauhinia binata* Blanco

Evergreen or briefly deciduous spreading shrub, scrambler or climber to 6 m high. Tomentum of fine, ferruginous hairs on young shoots and inflorescence, becoming glabrous. Stems with woody, simple, coiled tendrils. Leaf rachis 12-26 mm long; leaflets discoloured, transverse-oblong, -ovate or -suborbicular, 15-31 mm long, 24-48 mm wide, L/W 0.6-0.8. *Inflorescence* terminal, to 60 mm long. Pedicels 3-8 mm long. Hypanthium

faintly ribbed, c. 9 mm long. *Calyx* c. 9 mm long, lobes free or weakly adhering at base. *Petals* white, spatulate, 18-20 mm long, pubescent. *Stamens* red subequal. *Ovules* c. 15. *Pods* brown, subwoody to pithy, indehiscent, 77-165 mm long, 29-40 mm wide. *Seeds* red-brown, c. 10 mm long, 8 mm wide. *Flowering*: Dec - Feb; fruit available most months. Fig. 14

SE Asia to Australia where found in the NT and Qld. A coastal species, usually in deciduous vine thickets on dunes. Infrequent in the DR.



**L. cunninghamii** (Benth.) de Wit*Bauhinia cunninghamii* (Benth.) Benth.

*Trees* to 10 m high; bark dark grey, fissured, becoming shaggy. Indumentum of the vegetative parts a minute grey-white tomentum, of the pedicels, calyx and corolla red-brown and velutinous. *Leaf* rachis 12-27 mm long; *leaflets* concolorous, asymmetric-elliptic to ovate, 13-40 mm long, 10-28 mm wide, L/W 1.3-2.1. *Inflorescence* axillary, on old wood, to c. 30 mm long. Pedicels c. 7 mm long. Hypanthium 2-5 mm long. *Calyx* with a short tube; 7-9 mm long. *Petals* asymmetric, subequal, obovate, 11-15 mm long. *Stamens* grading in length. *Ovules* c. 12. *Pods* red when young, on stipe 12-22 mm

long, dehiscent, valves thin and stiffly coriaceous, 70-150 mm long, 46-63 mm wide. *Seeds* red-brown, c. 10 mm long, 8 mm wide. *Flowering*: May - Oct, peaking in July - Aug; fruit available most months. Fig. 14

**Bauhinia**

Widespread in the drier monsoonal regions of northern Australia. In the NT common in open woodland and savanna in latitudes between Katherine and Elliott; often on heavy soils and associated with limestone. In the DR known from the Daly R. Aborigines are reported using the bark and root of this species for the treatment of headache, as an antiseptic and antipyretic (Abor. Comm. NT, 1988).

**PARKINSONIA L.**

A genus of c. 15 species in the New World and South Africa. One introduced species in Australia.

**\*P. aculeata** L.

Evergreen multistemmed *shrub* or tree to 6 m, glabrate. *Stipules* small, setaceous, caducous or spiny, 1-5 mm long. *Leaves* bipinnate, rachis reduced, spinose to 18 mm or absent; pinnae 1-2 pairs, 185-380 mm long; rachillae flattened, green; *leaflets* alternate, deciduous, 48-154 per pinna, oblong, 1-8 mm long, 0.5-3.2 mm wide, L/W 2-3. *Inflorescence* an axillary raceme to 200 mm long. Bracts caducous, c. 2 mm long; bracteoles absent. Pedicels 10-15 mm long. Hypanthium c. 1 mm long. *Sepals* 5,  $\pm$  equal, elliptic, imbricate, 5-7 mm long. *Petals* 5, unequal, crimped, yellow, 9-12 mm long, claw tomentose, limb slightly broader than long, one petal slightly broader, with a longer claw and red spots. *Stamens* 10, free,

alternating long and short; filaments thickened and hairy at base; anthers dorsifixed, versatile, minutely apiculate. *Ovary* hairy; ovules 11-13; style glabrous; stigma minute, terminal. *Pods* torulose, indehiscent, coriaceous, olivaceous to brown, longitudinally nerved, 1-6-seeded, 85-130 mm long, 6-8 mm wide. *Seeds* longitudinal, narrowly elliptic to oblong, mottled olivaceous-brown, 8-10 mm long, 3.5-4 mm wide. *Flowering* and fruiting: most of the year. Fig. 14

**Parkinsonia**

Native to tropical America, now a widespread weed in Australia and a gazetted noxious weed in the NT. Rare in the DR where known from the floodplain of the Adelaide River, usually on seasonally flooded sites.

**PELTOPHORUM (Vog.) Benth.**

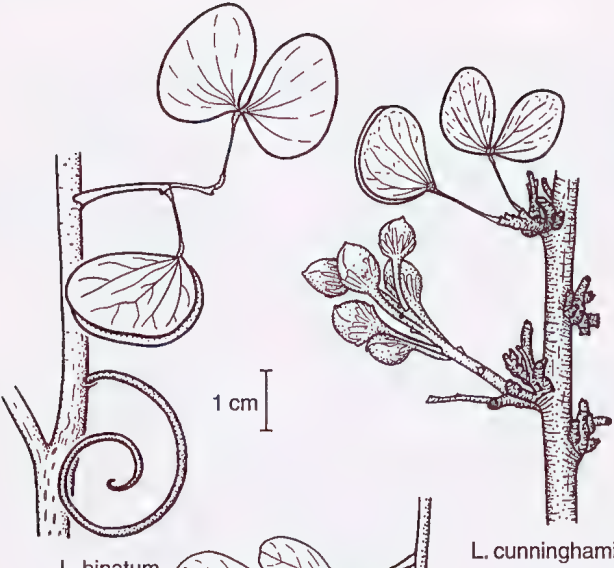
A genus of c. 15 species in the tropics and subtropics of both hemispheres. A single species in the NT.

**P. pterocarpum** (DC.) Heyne

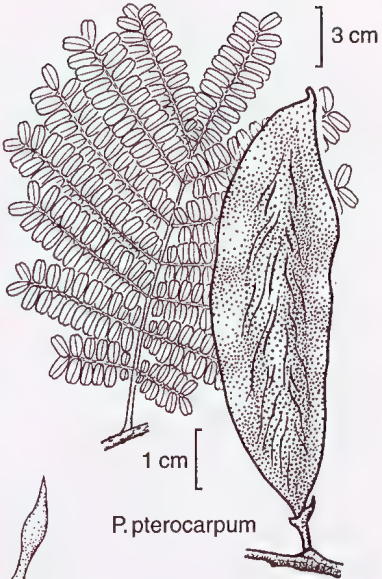
Deciduous *tree* to 10 m rarely higher; bark grey to brown. Vegetative parts, inflorescence, calyx, base of petals and staminal filaments with dense rusty appressed hairs, leaves becoming sparsely hairy with age. *Stipules* minute, caducous. *Leaves* bipinnate, rachis 95-260 mm long; pinnae 6-12 pairs, 35-120 mm long; *leaflets* opposite, discoloured, 9-17 pairs per pinna, oblong, asymmetric,

emarginate, 6-21 mm long, 2.7-10 mm wide, L/W 1.6-3.2. *Inflorescence* a terminal panicle of racemes to 250 mm long. Bracts caducous, c. 2 mm long; bracteoles absent. Pedicels 2.5-6 mm long. Hypanthium c. 2 mm long. *Sepals* 5, subequal, imbricate, elliptic, 7-11 mm long. *Petals* 5, yellow with brown central area, subequal, 10-21 mm long; claw thickened, broad, hairy; limb  $\pm$  orbicular, crimped. *Stamens* 10, free; filaments thickened at

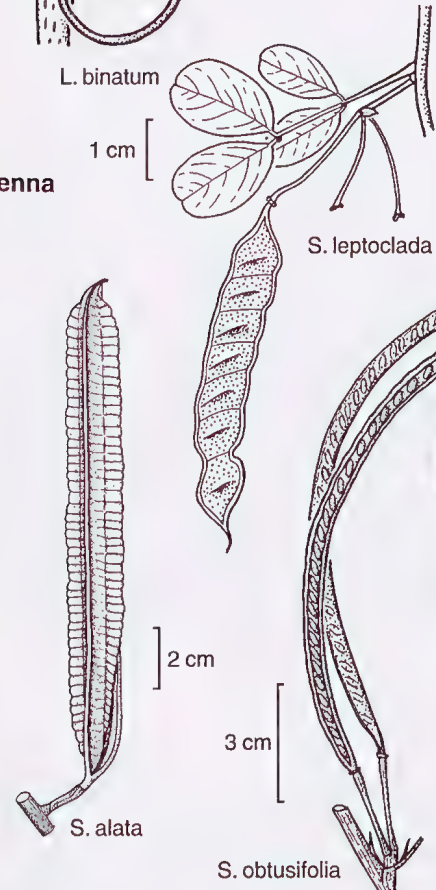
**Lysiphyllum**



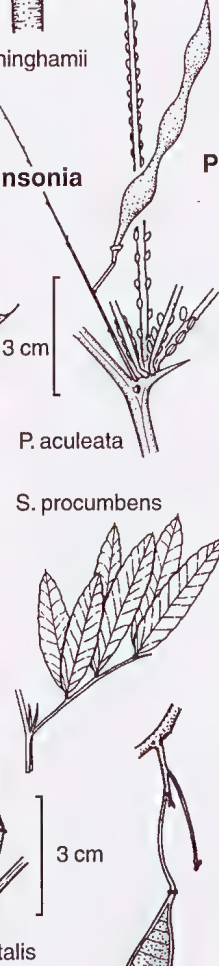
**Peltophorum**



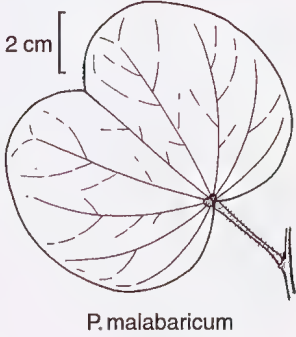
**Senna**



**Parkinsonia**



**Piliostigma**



**Tamarindus**

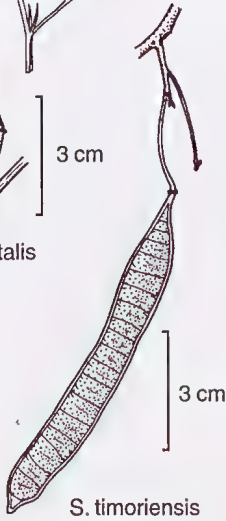
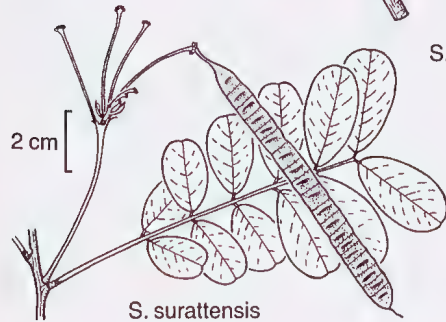
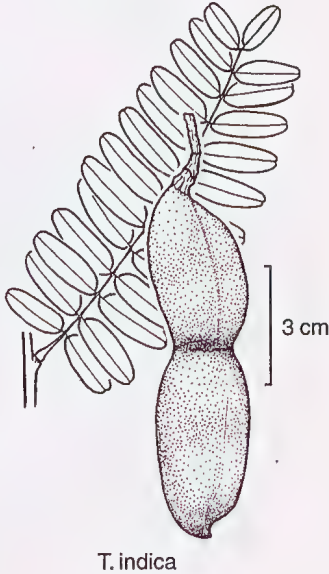


**Fig. 14**



base; anthers dorsifixed, versatile, uniform, dehiscing by longitudinal slits. *Ovary* hairy, flattened; ovules 2-4; style glabrous; stigma large, capitate. *Pods* flattened with wing-like margin, indehiscent, sub-woody, brown, weakly longitudinally striate, 1-4-seeded, oblong, 47-95 mm long, 14-27 mm wide. *Seeds* longitudinal, olivaceous, oblong, flat, c. 10 mm long, 5 mm wide. *Flowering*: late

Dry season; fruits persisting throughout year. Fig. 14 ***Peltophorum*, Yellow Flame Tree**

Native to tropical Australasia and Malesia and common in the DR; also frequently used in cultivation. Found in coastal vine thickets and margins of coastal floodplains on a variety of soil types.

## PILIOSTIGMA Hochst.

A genus of 6 species, from the tropics of the New and Old World; 1 species in northern Australia.

Formerly part of *Bauhinia* and retained by some authors in that genus. Characters which separate *Piliostigma* from *Bauhinia* and related genera include: Leaves bilobed; flowers dioecious; fertile stamens 10 (reduced in female flowers); stipe of ovary free; stigma large, capitate. [de Wit, 1956]

### ***P. malabaricum* (Roxb.) Benth.**

Deciduous, densely foliated *tree* to 10 m high, usually smaller; bark rough, shallowly fissured. All parts except upper surface of leaves rusty tomentose with short simple hairs and minute yellow fusiform vesicular medifixed glands. *Stipules* obscure. *Petioles* 12-47 mm long. *Leaves* discolorous, often whitish below; apparently simple, 45-100 mm long, 65-125 mm wide, L/W 0.7-0.9, cordate, emarginate, strongly palmately veined with a bristle in the sinus. *Inflorescence* racemose, axillary and terminal, to c. 65 mm long. Bracts and bracteoles minute, caducous. *Flowers* dioecious, on long peduncles to c. 30 mm long. *Hypanthium* 1.5-3 mm long. *Calyx* c. 10 mm long, sepals connate for most of their length. *Petals* white,

spathulate or oblanceolate, 11-16 mm long. *Stamens* in male flowers 10, included, filaments unequal; in female flowers variously reduced to staminodes; anthers dorsiventral, versatile, dehiscing by longitudinal slits. *Ovary* stipitate, tomentose and glandular; ovules c. 28; style hairy; stigma large, capitate, lobed. *Pods* on stipes 25-40 mm long; red-brown, indehiscent, flat, 175-230 mm long, 10-20 mm wide. *Seeds* immersed in fibrous pith; dark brown, ellipsoid, slightly flattened, c. 4.5 mm long, 3.5 mm wide. *Flowering*: Jan - Apr; fruiting: May - Sept. Fig. 14

Ranging from India to northern Australia; in the DR known from Mt Bunday and the Daly R. Occurs on a variety of soil types; usually in run-on areas in Eucalypt forest or along stream margins.

## SENNA Miller

Annual herbs or evergreen perennial shrubs or small trees. Hairs simple. *Stipules* usually present. Leaves compound paripinnate, usually terminated by a bristle; rachis usually with jugary or basal glands; stipellae absent. Bracts present; bracteoles absent. Sepals 5, free, imbricate or valvate. Petals 5, yellow, clawed, free. Stamens free, all 10 fertile and  $\pm$  equal or 7 fertile and 3 reduced to staminodes; anthers basifixed, opening by terminal pores, often longer than filament, sometimes beaked. Ovary mostly stipitate; style short, glabrous; stigma usually vaginate; ovules numerous. Pods flattened, thinly coriaceous, dehiscent, valves remaining flat after dehiscence.

About 240 species; circumtropical but most species in the Americas. [Randell, 1988, 1989, 1990]

- |                                                                               |                              |
|-------------------------------------------------------------------------------|------------------------------|
| 1. Leaflets >12 pairs per leaf; glands absent on leaf rachis .....            | <b><i>S. timoriensis</i></b> |
| 1. Leaflets <12 pairs per leaf; glands usually present on leaf rachis .....   | <b>2</b>                     |
| 2. Leaflets 8-11 pairs; gland at base of leaf rachis sunken; pod winged ..... | <b><i>S. alata</i></b>       |
| 2. Leaflets <8 pairs or if 8 then gland otherwise; pod not winged .....       | <b>3</b>                     |

- |    |                                                                                                                |                        |
|----|----------------------------------------------------------------------------------------------------------------|------------------------|
| 3. | Procumbent perennial with annual aerial stems; leaflets linear-oblong to narrowly elliptic, 7-15 mm wide ..... | <b>S. procumbens</b>   |
| 3. | Erect shrubs or trees; leaflets elliptic, obovate or lanceolate, mostly broader .....                          | <b>4</b>               |
| 4. | Leaf rachis >80 mm long .....                                                                                  | <b>5</b>               |
| 4. | Leaf rachis <80 mm long .....                                                                                  | <b>6</b>               |
| 5. | Annual; gland on leaf rachis just above pulvinus; leaflets acute .....                                         | <b>S. occidentalis</b> |
| 5. | Perennial shrub or tree; erect terete glands between lower 2-4 leaflet pairs; leaflets obtuse .....            | <b>S. surattensis</b>  |
| 6. | Perennial; stipules absent; stamens all perfect .....                                                          | <b>S. leptoclada</b>   |
| 6. | Annual; stipules linear; staminodes present .....                                                              | <b>7</b>               |
| 7. | Gland between lower 2 leaflet pairs; anthers truncate .....                                                    | <b>S. tora</b>         |
| 7. | Gland between basal pair of leaflets only; anthers beaked .....                                                | <b>S. obtusifolia</b>  |

**\*S. alata (L.) Roxb.**

*Cassia alata* L.

Evergreen *shrub* to 4 m, minutely tomentose on leaves, stems and calyx. *Stipules* persistent, broad-based, 5-8 mm long. *Leaves* terminated by a bristle, sunken gland at base of rachis, rachis 290-500 mm long; *leaflets* 8-11 pairs, oblong to obovate, 30-170 mm long, 20-102 mm wide, L/W 1.1-2.8. *Inflorescence* erect, axillary or terminal racemes to 500 mm long. Bracts caducous, brown, membranous, obovate, 20-28 mm long, covering bud; bracteoles absent. Pedicels 4-8 mm long. *Sepals* elliptic to obovate, 12-17 mm long. *Petals* ± orbicular, 12-20 mm long. *Stamens* 10, 2 large, 5 medium-sized, 3 small; style short, curved, beaked. *Ovary* hairy. *Pods* dark brown to black, stipitate, 4-angled including 2 broad crenate membranous wings, 130-185 mm long, 14-24 mm wide. *Seeds* numerous, transverse, lying at right angles to axis of pod, rhomboid, flattened with central rib, dark grey to black, c. 6 x 4.5 mm. *Flowering*: May - June; fruits persist throughout year. Fig. 14 **Candlebush**

Originally from S America, now a pantropic weed or ornamental. From Qld to the NT; common in the DR associated with perennially moist areas.

**S. leptoclada (Benth.) Randell**

*Cassia leptoclada* Benth.

Perennial glabrous *shrubs* to 2 m. *Stipules* absent. *Leaves* with conical jugary glands present, rachis (3)20-60 mm long; *leaflets* (1)2-3 pairs, subglaucous, elliptic to obovate, slightly asymmetric at base, 10-44 mm long, 5-27 mm wide. L/W 1.3-2.2. *Inflorescence* axillary, a reduced raceme, often umbelliform. Bracts 2-3 mm long; bracteoles absent; peduncle 5-24 mm long; pedicels 10-18 mm long. *Sepals* unequal, elliptic to ± orbicular, 3.5-6 mm long. *Petals* obovate to ± orbicular, 9-18 mm long.

*Stamens* 10, equal, beak absent. *Pods* brown, stipitate, oblong and slightly curved with persistent stigma, broadly crenate, 15-60 mm long, 9-12 mm wide. *Seeds* 1-8, black, oblique in pod, narrowly oblong, 5-6 mm long, 3-4 mm wide. *Flowering* and fruiting: for most of the year. Fig. 14

Restricted to sandstone in Arnhem Land, the Gulf of Carpentaria and Mt Douglas in the DR.

**\*S. obtusifolia (L.) Irwin & Barneby**

*Cassia obtusifolia* L.

Annual *shrub* to 2 m. Indumentum of sparse, simple, white hairs. *Stipules* persistent, linear, 8.5-20 mm long. *Leaves* terminated by a bristle, 2-3 pairs of leaflets, pulvinus drying dark, erect terete gland between basal pair, rachis to basal leaflets 8-50 mm long, rachis 20-80 mm long; *leaflets* 2-3 pairs, obovate to broadly spatulate, base slightly asymmetric, 21-67 mm long, 12-36 mm wide, L/W 1.4-2.4. *Inflorescence* an axillary reduced raceme; peduncle c. 1 mm long, flowering pedicels 7-16 mm long, pedicel and receptacle with colleters. Bracts like stipules, 3-6.5 mm long; bracteoles absent. *Sepals* unequal, elliptic, ciliate, 4-9 mm long. *Petals* obovate, subequal, 10-11 mm long. Functional *stamens* 5-7, shortly beaked; staminodes c. 3. *Ovary* hairy, sessile. *Pods* on pedicel 18-25 mm long, brown, stipitate, ribbed on each margin, slightly flattened, linear, *Seeds* oblique but pod with transverse septa, rhomboid, slightly flattened, brown to olivaceous, 4.3-5.5 mm long, 2.7-4 wide, areole longitudinal, c. 0.5 mm wide. *Flowering* and fruiting: Feb - Aug. Fig. 14

Probably a native of tropical America, now a widespread weed. Recorded from northern NT and Qld. In the DR often in dense swards on moist disturbed areas on the margins of the coastal floodplains.



**\*S. occidentalis (L.) Link***Cassia occidentalis* L.

Erect annual *shrub* to 1.2 m. Sparse simple hairs on leaflet margin, rachis and pedicels, sparse minute colleters on undersurface of leaflets, leaf rachis, stems and pods. *Stipules* caducous. *Leaves* terminated by a bristle, 3-5 pairs of leaflets, erect gland just above pulvinus, rachis to basal leaflets 30-57 mm long, rachis 85-165 mm long; *leaflets* 3-5 pairs, lanceolate to obovate, 35-120 mm long, 15-39 mm wide, L/W 1.8-3.7. *Inflorescence* terminal or axillary racemes to 130 mm long. Bracts lanceolate, long acuminate, 6-15 mm long; bracteoles absent; pedicels 4-9 mm long. *Sepals* unequal, elliptic, 7-10 mm long. *Petals* unequal, spatulate to obovate, 8-15 mm long. Functional *stamens* 6-7, beaked, 2 enlarged; staminodes 3-4. *Ovary* hairy, sessile; stigmatic surface linear, on underside of curved style, hairy. *Pods* pale brown with broad pale margins, slightly flattened and curved, 100-130 mm long, 8-10 mm wide. *Seeds* 21-50, transverse in pod, olivaceous to grey-brown, obovate to oblong, 4.2-4.7 mm long, 2-4 mm wide, broad areole c. 1.1 mm wide. *Flowering* and fruiting: Jan - July. Fig. 14

Probably a native to the American tropics. Now widespread in the tropics and throughout northern Australia. A common weed in the DR in disturbed habitats.

**S. procumbens** Randell

Prostrate or procumbent *shrub*, annual aerial parts from a perennial rootstock. Indumentum of very sparse simple white hairs and colleters or glabrous. *Stipules* persistent, linear, 6-9 mm long. *Leaves* terminated by a long bristle, erect terete gland between leaflets, rachis to basal leaflets (5)10-66 mm long, rachis 24-44 mm long; *leaflets* 1-3 pairs linear-oblong to narrowly elliptic, asymmetric at base, 35-58 mm long, 7-15 mm wide, L/W 2.5-5.5. *Inflorescence* axillary, umbelliform, 40-65 mm long, 5-8-flowered. Bracts persistent, triangular, ciliate, 3-4 mm long; bracteoles absent; pedicels 13-14 mm long. *Sepals* unequal, elliptic, 4.5-7 mm long. *Petals* obovate, 11-18 mm long. *Stamens* 10,  $\pm$  equal, apiculate. *Ovary* glabrous. *Pods* [from Randell, 1989] 50-70 mm long, 8 mm wide, dark, straight or slightly curved, edge not crenate. *Seeds* not seen. *Flowering*: Jan. Fig. 14

An NT endemic known only from the Pine Creek area in woodland on sandy soils.

**S. surattensis** (Burin. f.) Irwin & Barneby*Cassia surattensis* Burm.f.

Shrub or small glabrate *tree* to 7 m. *Stipules* subpersistent, linear, to 15 mm long. *Leaves* termi-

nated by a bristle, 5-8 pairs of leaflets, erect terete gland between lower 2-4 pairs of leaflets, rachis to basal leaflets 20-60 mm long, rachis 90-170 mm long; *leaflets* 5-8 pairs, elliptic to obovate, 20-50 mm long, 13-25 mm wide, L/W 1.6-2.3. *Inflorescence* an axillary raceme or subumbelliform, to 100 mm long. Bracts narrowly-elliptic, 4.5-6 mm long; bracteoles absent; pedicels 14-21 mm long. *Sepals* unequal,  $\pm$  orbicular, ciliate, 7-10 mm long. *Petals*  $\pm$  equal, obovate, 11-19 mm long. *Stamens*  $\pm$  equal, 10, beaked. *Ovary* hairy; stigma minute. *Pods* brown, flattened, stipitate, oblong,  $\pm$  straight, 90-140 mm long, 10-13 mm wide, glabrous. *Seeds* 12-26, transverse in pod, black, shiny, oblong to elliptic, 5-6 mm long, 2.7-3.5 mm wide, areole 0.9-1.2 mm wide. *Flowering* and fruiting: Feb - June. Fig. 14

Native to SE Asia. Sometimes recorded as introduced in Australia but early collections by Robert Brown in 1802 indicate the species is native in the NT. It is found across northern Australia but is rare in the DR where known from Melville Is. and Darwin. On dunes and laterite along the coast, associated with vine thicket.

**S. timoriensis** (DC.) Irwin & Barneby*Cassia timoriensis* DC

*Shrub* to 3 m rarely higher. Indumentum of dense, patent hairs, rusty on young growth, sometimes glabrate on upper leaflet surface. *Stipules* caducous. *Leaves* without glands, rachis to basal leaflets (6)11-30 mm long, rachis 110-210 mm long; *leaflets* 14-22 pairs, narrowly elliptic, lanceolate or oblong, 19-42 mm long, 5.5-15 mm wide, L/W 2.1-4. *Inflorescence* axillary racemes or terminal panicles to 70 mm long. Bracts caducous, ovate, c. 2.5 mm long; fruiting pedicels 18-25 mm long. *Sepals* unequal,  $\pm$  orbicular to narrowly triangular, 3-5.5 mm long. *Petals* elliptic, 9 mm long. Functional *stamens* 7, variable in size, beak absent; staminodes 3. *Ovary* sparsely hairy at base, shortly stipitate; stigma minute. *Pods* brown, stipitate, flattened, oblong,  $\pm$  straight, 8-17-seeded, 55-94 mm long, 9-12 mm wide. *Seeds* transverse, obovate to oblong, flattened, 5-7 mm long, 3-7 mm wide, areole c. 0.7 mm wide. *Flowering*: Mar; fruiting: Mar - Aug. Fig. 14

Timor and northern Australia. Rare in the DR where known only from granite hills at Mt Bunday. Recorded on rocky hills of sandstone or granite; usually associated with vine thicket.

**\*S. tora** (L.) Roxb.

Erect *annual* to 70 cm. Indumentum of simple appressed hairs. *Stipules* persistent, linear, 5-8 mm long. *Leaves* with 3 pairs of leaflets, pulvinus

drying dark, erect terete glands between lower 2 pairs, rachis to basal leaflets 20-40 mm long, rachis 32-60 mm long; *leaflets* 3 pairs, obovate, base slightly asymmetric, 15-45 mm long, 10-23 mm wide, L/W 1.5-2. *Inflorescence* an axillary reduced raceme; peduncle c. 1 mm long; flowering pedicels 2-8 mm long; colleters on pedicel and receptacle. Bracts as for stipules, 2-3 mm long. *Sepals* unequal, elliptic,

ciliate, 3.5-6 mm long. Functional *stamens* 7, beak absent; staminodes 3. *Ovary* hairy, sessile. Mature *Pods* and seed not seen. *Flowering*: Apr. Not illustrated.

From India to China. Introduced in Qld and NT. Rare in the DR where known from the Daly and Reynolds Rivers. On black soil plains or edges of billabongs.

## TAMARINDUS L.

A monotypic genus widespread in the tropics of the Old World. Because of extensive cultivation the natural range is now uncertain but the species is certainly indigenous at least in Africa and India.

### \**T. indica* L.

Evergreen *tree* to 25 m; bark brown, fissured. Stems with short patent simple hairs, otherwise glabrous. *Stipules* minute, caducous. *Leaves* paripinnate, rachis 40-125 mm long; *leaflets* 11-18 pairs, slightly discoloured, oblong, asymmetric, emarginate, 5-26 mm long, 3.5-10 mm wide, L/W 1.4-3.8. *Inflorescence* terminal or axillary racemes to 210 mm long. Bracts and bracteoles caducous, oblanceolate-cymbiform, c. 7 mm long. Hypanthium narrowly turbinate, 3-5 mm long. *Sepals* 4, free, imbricate, unequal, narrow-elliptic, 9.5-11 mm long. *Petals* 5, apricot to maroon, streaked or mottled, unequal, 2 as minute bristles or scales, 3 naviculate, crimped and crenate, narrow-elliptic, centre petal with thickened base, 6-12 mm long. *Stamens* 3 functional, fused for half their length into

a flattened claw, with 4 vestigial staminodes as teeth between filaments; anthers dorsifixed, versatile, opening by longitudinal slits. *Ovary* stipitate, arising from one side of hypanthium, glabrous; ovules 11-12; style fringed on one side; stigma capitate. *Pods* brown, scurfy, crustaceous, indehiscent, flattened cylindrical, irregularly constricted between seeds, 50-95 mm long, 19-26 mm wide. *Seeds* 1-5, brown, flattened, quadrate, c. 10 mm long, 9 mm wide, immersed in fibrous, brown, acid, edible pulp. *Flowering*: Feb - Mar; fruits persisting throughout year. Fig. 14

### Tamarind

Introduced by the Macassans to the north Australian coast (Macknight, 1976). Now widely scattered at coastal localities in vine thickets. Also commonly cultivated for the edible fruit and as a shade tree.

## FABACEAE

Trees, shrubs, herbs or vines; stems rarely expanded and leaf-like (cladodes) with reduced leaves. Stipules usually present; stipels present or absent. Leaves mostly alternate, compound or less often, simple; often with a distinct pulvinus. Inflorescences various; flowers zygomorphic, bisexual. Calyx tubular, 5-, rarely 4-lobed or 2-lipped, the lobes equal or not, imbricate or valvate. Petals 5, imbricate, free at the base, the keel petals often partly connate; adaxial petal (standard or vexillum) outermost and usually the largest, the lateral petals (wings) enclosing the 2 innermost (keel) petals which enclose the androecium and gynoecium. Stamens 10, rarely fewer, free or more often united into a sheath for part of their length, the upper (adaxial or vexillary) stamen often free or nearly so ( $\approx 9+1$  in descriptions), filaments often alternating long and short; anthers 2-locular, uniform or alternately basifixed and dorsifixed, opening by longitudinal slits. Ovary 1-carpellate with terminal style and stigma; 1-locular with marginal placentation. Fruit a legume, dry, usually dehiscent along



both sutures, less often indehiscent; sometimes breaking transversely into (usually indehiscent) 1-seeded articles (e.g. *Aeschynomene*). Seeds usually without endosperm, the embryo with large cotyledons. Fig. 15

A cosmopolitan family of c. 440 genera and over 11,000 species. In Australia about 136 genera and 1100 species with 64 genera in the NT. In the DR there are 43 genera and 131 species with 144 species treated here. Some taxonomists treat this family, along with Caesalpiniaceae and Mimosaceae, as a subfamily of Leguminosae *sens. lat.* The family can be divided into 32 tribes, not all of which occur in the NT. The tribes and their constituent genera occurring in the DR are as follows:

Sophoreae - *Sophora*;

Dalbergieae - *Dalbergia*;

Abreae - *Abrus*;

Tephrosieae - *Derris*, *Pongamia*, *Tephrosia*;

Robinieae - *Sesbania*;

Indigoferaeae - *Indigofera*;

Desmodieae - *Dendrolobium*, *Desmodium*, *Pycnospora*, *Uraria*, *Christia*, *Alysicarpus*;

Phaseoleae (with subtribes) -

Erythrinae - *Erythrina*, *Mucuna*;

Diocleinae - *Canavalia*, *Galactia*, *Calopogonium*;

Glycininae - *Glycine*;

Clitoriinae - *Centrosema*, *Clitoria*;

Phaseolinae - *Austrodolichos*, *Vigna*, *Macroptilium*;

Cajaninae - *Cajanus*, *Dunbaria*, *Flemingia*, *Rhynchosia*, *Eriosema*;

Psoraleae - *Psoralea*;

Aeschynomeneae - *Aeschynomene*, *Smithia*, *Cyclocarpa*, *Zornia*, *Stylosanthes*;

Mirbelieae - *Leptosema*, *Gompholobium*, *Jacksonia*, *Daviesia*;

Bossiaeeae - *Templetonia*, *Bossiaea*;

Crotalarieae - *Crotalaria*

The family Fabaceae is a major source of plants of economic importance. Many genera are important to the NT pastoral industry as sources of fodder plants (*Alysicarpus*, *Calopogonium*, *Centrosema*, *Macroptilium*, *Stylosanthes*, *Vigna*) or of plants toxic to livestock (*Crotalaria*, *Indigofera*, *Tephrosia*). Species of a number of genera can be weeds under some land uses (*Alysicarpus*, *Calopogonium*, *Centrosema*, *Clitoria*, *Dalbergia*, *Desmodium*, *Macroptilium*, *Stylosanthes*). Some introduced species of *Cajanus*, *Canavalia*, *Glycine* and *Vigna* are important commercial sources of pulses and legumes. Species of *Dalbergia* are exploited overseas for their timber. The introduced species *Clitoria ternatea*, *Gliricidia sepium* (Jacq.) Walp., *Pterocarpus indicus* Willd. and *Sesbania grandiflora* (L.) Poir. are grown locally as ornamentals. A number of genera (*Clitoria*, *Eriosema*, *Flemingia*, *Mucuna*, *Vigna*) have been analysed by Saxon (1981) as possible sources of fuel. *Indigofera tinctoria* is a source of the blue dye Indigo whilst *Derris* is a commercial source of insecticide. Aboriginal people in the NT have traditionally eaten the root tubers of species of *Austrodolichos*, *Dunbaria*,

*Eriosema*, *Erythrina*, *Flemingia* and *Vigna* and used species of *Tephrosia* as fish poisons. The key to genera has been derived from that in Morley & Toelken (1983). [Hutchinson, 1967; Gillett *et al.*, 1971; Verdcourt, 1979; Kay, 1979; Polhill & Raven, 1981; Cameron *et al.*, 1984; Skerman *et al.*, 1988]

### THE FABACEAE FLOWER

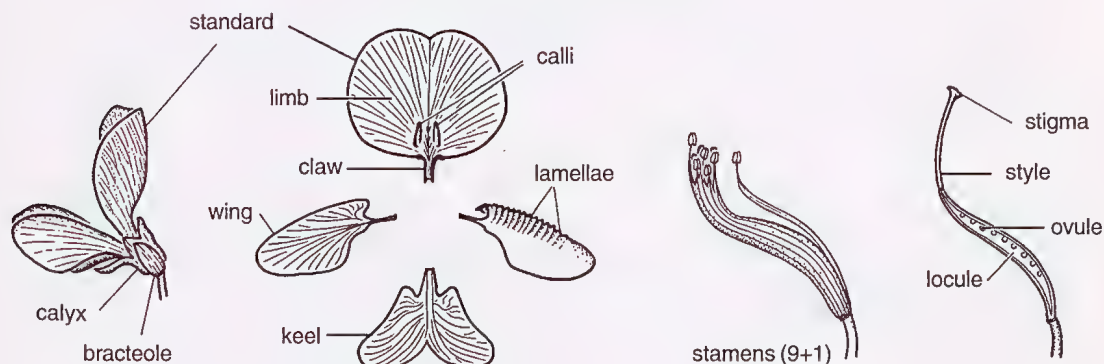


Fig. 15

#### KEY TO GROUPS

- |                                                                                           |         |
|-------------------------------------------------------------------------------------------|---------|
| 1. All leaves of 1 leaflet, or leaves simple, reduced, or absent .....                    | 2       |
| 1. Leaves compound, comprised of 2 or more leaflets, rarely some leaves 1-foliolate ..... | 4       |
| 2. Leaves absent or reduced to spines or scales .....                                     | GROUP 1 |
| 2. Leaves simple or 1-foliolate .....                                                     | 3       |
| 3. Leaves simple .....                                                                    | GROUP 2 |
| 3. Leaves 1-foliolate, with articulation or bend in petiole .....                         | GROUP 3 |
| 4. Leaflets even in number, rachis often ending a bristle or tendril .....                | GROUP 4 |
| 4. Leaflets odd in number, rachis ending in a leaflet, or character not obvious .....     | 5       |
| 5. Leaflets 5 or more, rarely some leaves 3-foliolate .....                               | GROUP 7 |
| 5. Leaflets 3 .....                                                                       | 6       |
| 6. Leaves digitate, all 3 leaflet stalks equal .....                                      | GROUP 5 |
| 6. Leaves pinnate, central leaflet stalk longer than laterals .....                       | GROUP 6 |

#### KEY TO GROUP 1

- |                                                                                                         |                  |
|---------------------------------------------------------------------------------------------------------|------------------|
| 1. Stamens all free, or very slightly connate at base .....                                             | 2                |
| 1. Stamens variously united .....                                                                       | 3                |
| 2. Standard more or less orbicular; ovules 2 .....                                                      | <i>Jacksonia</i> |
| 2. Standard not orbicular, greatly modified, usually shorter than keel; ovules mostly more than 2 ..... | <i>Leptosema</i> |
| 3. Trees with red flowers, leafless at flowering .....                                                  | <i>Erythrina</i> |
| 3. Shrubs or subshrubs with yellow flowers .....                                                        | <i>Bossiaea</i>  |

#### KEY TO GROUP 2

- |                                              |                 |
|----------------------------------------------|-----------------|
| 1. Stamens free or united at very base ..... | <i>Daviesia</i> |
| 1. Stamens variously united .....            | 2               |



|    |                                                                                                               |                   |
|----|---------------------------------------------------------------------------------------------------------------|-------------------|
| 2. | All 10 stamens united from base in a tube which is closed or open on upper side .....                         | <b>Crotalaria</b> |
| 2. | Upper stamen free at least at base, other 9 joined in a sheath .....                                          | <b>3</b>          |
| 3. | Anthers tipped by a small raised gland; clothing of more or less appressed,<br>laterally attached hairs ..... | <b>Indigofera</b> |
| 3. | Not as above .....                                                                                            | <b>4</b>          |
| 4. | Leaflets dotted below with yellow resinous deposits .....                                                     | <b>Eriosema</b>   |
| 4. | Leaflets lacking resinous deposits .....                                                                      | <b>5</b>          |
| 5. | Standard glabrous .....                                                                                       | <b>Galactia</b>   |
| 5. | Standard hairy on back .....                                                                                  | <b>Tephrosia</b>  |

**KEY TO GROUP 3**

|     |                                                                                                  |                     |
|-----|--------------------------------------------------------------------------------------------------|---------------------|
| 1.  | Anthers tipped by a small raised gland; clothing of appressed,<br>laterally attached hairs ..... | <b>Indigofera</b>   |
| 1.  | Not as above .....                                                                               | <b>2</b>            |
| 2.  | All 10 stamens united in a sheath split along upper side, at least towards base .....            | <b>3</b>            |
| 2.  | Stamens all or mostly united but not as above .....                                              | <b>5</b>            |
| 3.  | Leaflets filiform .....                                                                          | <b>Templetonia</b>  |
| 3.  | Leaflets otherwise .....                                                                         | <b>4</b>            |
| 4.  | Pods inflated .....                                                                              | <b>Crotalaria</b>   |
| 4.  | Pods flattened .....                                                                             | <b>Dendrolobium</b> |
| 5.  | Pod transversely jointed, divided into 1 or more 1-seeded articles .....                         | <b>6</b>            |
| 5.  | Pod continuous, not jointed, sometimes short and 1- or 2-seeded .....                            | <b>9</b>            |
| 6.  | Pod exserted from calyx .....                                                                    | <b>7</b>            |
| 6.  | Pod enclosed by calyx .....                                                                      | <b>8</b>            |
| 7.  | Calyx scarious; pod more or less cylindrical .....                                               | <b>Alysicarpus</b>  |
| 7.  | Calyx herbaceous; pod flat or slightly turgid .....                                              | <b>12</b>           |
| 8.  | Calyx lobes short and broad, enlarged in fruit .....                                             | <b>Christia</b>     |
| 8.  | Calyx lobes very slender, not enlarged in fruit .....                                            | <b>Uraria</b>       |
| 9.  | Ovule 1 .....                                                                                    | <b>Psoralea</b>     |
| 9.  | Ovules 2 or more .....                                                                           | <b>10</b>           |
| 10. | Leaflets dotted below with yellow resinous deposits .....                                        | <b>Eriosema</b>     |
| 10. | Leaflets lacking resinous deposits .....                                                         | <b>11</b>           |
| 11. | Flowers blue or white; standard inverted .....                                                   | <b>Clitoria</b>     |
| 11. | Flowers orange; standard not inverted .....                                                      | <b>Tephrosia</b>    |
| 12. | Flowers in fascicles .....                                                                       | <b>Dendrolobium</b> |
| 12. | Flowers otherwise .....                                                                          | <b>Desmodium</b>    |

**KEY TO GROUP 4**

|    |                                                                                |              |
|----|--------------------------------------------------------------------------------|--------------|
| 1. | Leaflets many pairs; trees, erect shrubs greater than 1 m or woody vines ..... | <b>2</b>     |
| 1. | Leaflets 1 to few pairs; herbs or low subshrubs .....                          | <b>4</b>     |
| 2. | Woody climbers; seeds red and black or rarely plain black .....                | <b>Abrus</b> |
| 2. | Trees or erect subshrubs; seeds not as above .....                             | <b>3</b>     |

- |    |                                                                                                                                       |                     |
|----|---------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 3. | Pods cylindrical, not jointed .....                                                                                                   | <b>Sesbania</b>     |
| 3. | Pods compressed, transversely jointed and separating into 1-seeded articles .....                                                     | <b>Aeschynomene</b> |
| 4. | Leaflets 1 pair .....                                                                                                                 | <b>Zornia</b>       |
| 4. | Leaflets 2 or more pairs, pinnate (rachis visible between pairs) .....                                                                | <b>5</b>            |
| 5. | Pods coiled into circle or tight spiral; calyx falling; leaflets 2-4 pairs;<br>glabrous except for hairs on underside of rachis ..... | <b>Cyclocarpa</b>   |
| 5. | Pods straight or with articles $\pm$ zig-zag; leaflets 4-8 pairs;<br>indumentum of long bristles .....                                | <b>Smithia</b>      |

**KEY TO GROUP 5**

- |    |                                                                                   |                     |
|----|-----------------------------------------------------------------------------------|---------------------|
| 1. | All 10 stamens united in a sheath open along the upper side .....                 | <b>2</b>            |
| 1. | Stamens all united in a closed tube, OR upper stamen wholly or partly free .....  | <b>4</b>            |
| 2. | Upper 2 calyx lobes greatly enlarged and/or joined higher than lower 3 .....      | <b>Templetonia</b>  |
| 2. | Calyx lobes sub-equal, or if unequal then not as above .....                      | <b>3</b>            |
| 3. | Pod enclosed within floral bracts, indehiscent, not inflated .....                | <b>Stylosanthes</b> |
| 3. | Pod not enclosed within floral bracts, dehiscent, inflated .....                  | <b>Crotalaria</b>   |
| 4. | Leaves dotted with minute superficial vesicular glands, at least underneath ..... | <b>Flemingia</b>    |
| 4. | Not as above .....                                                                | <b>5</b>            |
| 5. | Stipules joined into 1, striate; pod jointed, of 2, 1-seeded articles .....       | <b>Desmodium</b>    |
| 5. | Stipules mostly small or absent; pod not jointed .....                            | <b>6</b>            |
| 6. | Standard sericeous on back .....                                                  | <b>Tephrosia</b>    |
| 6. | Standard not sericeous on back .....                                              | <b>7</b>            |
| 7. | Clothing of laterally attached hairs; anthers tipped by a raised gland .....      | <b>Indigofera</b>   |
| 7. | Not as above .....                                                                | <b>Glycine</b>      |

**KEY TO GROUP 6**

- |    |                                                                                                                                      |                     |
|----|--------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1. | Anthers tipped by a raised gland; clothing of more or less appressed,<br>laterally attached hairs; flowers in axillary racemes ..... | <b>Indigofera</b>   |
| 1. | Not as above .....                                                                                                                   | <b>2</b>            |
| 2. | Stipels clearly and consistently present at base of each leaflet, rarely gland-like;<br>frequently twining or climbing plants .....  | <b>3</b>            |
| 2. | Stipels absent or inconsistently present .....                                                                                       | <b>19</b>           |
| 3. | Trees with red flowers, sometimes leafless when flowering .....                                                                      | <b>Erythrina</b>    |
| 3. | Not as above .....                                                                                                                   | <b>4</b>            |
| 4. | Keel equal to or longer than standard .....                                                                                          | <b>Mucuna</b>       |
| 4. | Keel shorter than standard .....                                                                                                     | <b>5</b>            |
| 5. | Style bearded, or hairy more than halfway .....                                                                                      | <b>6</b>            |
| 5. | Style glabrous, or hairy less than halfway .....                                                                                     | <b>9</b>            |
| 6. | Standard glabrous on back .....                                                                                                      | <b>7</b>            |
| 6. | Standard pubescent on back, equal to or greater than 2 cm long .....                                                                 | <b>30</b>           |
| 7. | Style uniformly thick or thin, or tapering .....                                                                                     | <b>Calopogonium</b> |
| 7. | Style abruptly divided into thin basal part and thickened upper part .....                                                           | <b>8</b>            |



- |     |                                                                                                                                                    |                               |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 8.  | Thickened part of style bent through 90° just above the base, then curved and slightly narrowed towards the apex, resembling a squarish hook ..... | <b>Macroptilium</b>           |
| 8.  | Style not as above, variously and smoothly curved .....                                                                                            | <b>Vigna</b>                  |
| 9.  | Leaflets and calyx dotted with minute superficial yellow to red vesicular glands .....                                                             | <b>10</b>                     |
| 9.  | Superficial vesicular glands absent .....                                                                                                          | <b>12</b>                     |
| 10. | Pods depressed or grooved between seeds .....                                                                                                      | <b>Cajanus</b>                |
| 10. | Pods not depressed or grooved between seeds .....                                                                                                  | <b>11</b>                     |
| 11. | Ovules 3 or more; pods often curved, acuminate .....                                                                                               | <b>Dunbaria</b>               |
| 11. | Ovules 1 or 2; pods round or oblong .....                                                                                                          | <b>Rhynchosia</b>             |
| 12. | Shrubby with inflorescence-rachis and calyx covered with gland-based hairs; pod inflated, with raised venation .....                               | <b>Pycnospora</b>             |
| 12. | Not as above .....                                                                                                                                 | <b>13</b>                     |
| 13. | Pods transversely jointed, separating into 1-seeded articles .....                                                                                 | <b>14</b>                     |
| 13. | Pods not as above .....                                                                                                                            | <b>16</b>                     |
| 14. | Pods not enclosed by calyx .....                                                                                                                   | <b>Desmodium/Dendrolobium</b> |
|     |                                                                                                                                                    | (see <b>Desmodium</b> key)    |
| 14. | Pods enclosed by calyx .....                                                                                                                       | <b>15</b>                     |
| 15. | Calyx lobes short and broad, enlarged in fruit .....                                                                                               | <b>Christia</b>               |
| 15. | Calyx lobes very narrow, not enlarged in fruit .....                                                                                               | <b>Uraria</b>                 |
| 16. | Flowers solitary or clustered in leaf axils, or 1 or 2 on axillary peduncles, or in terminal false racemes .....                                   | <b>Austrodolichos</b>         |
| 16. | Flowers several to many in axillary racemes, pseudoracemes or terminal panicles, sometimes clustered at apex of peduncle .....                     | <b>17</b>                     |
| 17. | Pod with prominent longitudinal rib(s) near suture(s), or winged .....                                                                             | <b>Canavalia</b>              |
| 17. | Pod not as above .....                                                                                                                             | <b>18</b>                     |
| 18. | Upper 2 calyx lobes joined to or almost to apex, calyx appearing 4-lobed or 2-lipped ....                                                          | <b>Galactia</b>               |
| 18. | Calyx with 5 lobes or teeth, or slightly 2-lipped by upper 2 lobes more joined than lower .....                                                    | <b>Glycine</b>                |
| 19. | Margin of leaflets toothed or crenulate, or if entire then plants dotted with immersed black or shining punctate glands .....                      | <b>Psoralea</b>               |
| 19. | Margin of leaflets entire .....                                                                                                                    | <b>20</b>                     |
| 20. | Undersides of leaflets, calyx and sometimes petals dotted with minute superficial yellow to red vesicular glands (may be obscure) .....            | <b>21</b>                     |
| 20. | Superficial vesicular glands absent .....                                                                                                          | <b>23</b>                     |
| 21. | Pods depressed or grooved between seeds .....                                                                                                      | <b>Cajanus</b>                |
| 21. | Pods not depressed or grooved between seeds .....                                                                                                  | <b>22</b>                     |
| 22. | Ovules 3 or more; pods often curved, acuminate .....                                                                                               | <b>Dunbaria</b>               |
| 22. | Ovules 1 or 2; pods round or oblong .....                                                                                                          | <b>Rhynchosia</b>             |
| 23. | Pod articulated, breaking into 1-seeded segments .....                                                                                             | <b>24</b>                     |
| 23. | Pod not articulated .....                                                                                                                          | <b>25</b>                     |
| 24. | Pod enclosed in floral bracts, terminal article with hooked persistent style .....                                                                 | <b>Stylosanthes</b>           |
| 24. | Pod exerted or enclosed only within calyx, terminal article without persistent style .....                                                         | <b>Desmodium</b>              |
| 25. | Flowers clustered in leaf axils, or in heads or spikes; pod 1(2)-seeded, enclosed in bracts .....                                                  | <b>Stylosanthes</b>           |

|                                                                                                                 |             |
|-----------------------------------------------------------------------------------------------------------------|-------------|
| 25. Inflorescence a raceme, sometimes few-flowered and sub-umbellate;<br>pod exserted, more than 1-seeded ..... | 26          |
| 26. Standard silky hairy behind .....                                                                           | Tephrosia   |
| 26. Standard not silky hairy behind .....                                                                       | 27          |
| 27. Leaflets filiform; calyx of 4 acuminate lobes by union of upper 2 teeth .....                               | Templetonia |
| 27. Leaflets and calyx otherwise .....                                                                          | 28          |
| 28. Trees .....                                                                                                 | Dalbergia   |
| 28. Vines .....                                                                                                 | 29          |
| 29. Pods >80 mm long; beach front or vine forest habitats .....                                                 | Canavalia   |
| 29. Pods <60 mm long; mangrove habitat .....                                                                    | Derris      |
| 30. Flowers white .....                                                                                         | Clitoria    |
| 30. Flowers purple .....                                                                                        | Centrosema  |

## KEY TO GROUP 7

|                                                                                                                              |              |
|------------------------------------------------------------------------------------------------------------------------------|--------------|
| 1. Stamens all free, or rarely filaments shortly united at base .....                                                        | 2            |
| 1. Stamens mostly united by filaments .....                                                                                  | 3            |
| 2. Shrubs; leaflets $\leq 5$ mm broad, terminal one sessile; pod globular,<br><10 mm long .....                              | Gompholobium |
| 2. Trees or tall shrubs; leaflets >5 mm broad, usually very broad;<br>pod >50 mm long, moniliform .....                      | Sophora      |
| 3. Anthers tipped by small raised gland; clothing of more or less appressed<br>laterally attached hairs .....                | Indigofera   |
| 3. Not as above .....                                                                                                        | 4            |
| 4. Stamens all united in a sheath open along the upper side .....                                                            | 5            |
| 4. Stamens variously united, not as above, or if (rarely) so, then pod indehiscent<br>and usually ornamented or winged ..... | 6            |
| 5. Leaves digitate (no rachis between leaflets) .....                                                                        | Crotalaria   |
| 5. Leaves pinnate (rachis between leaflets) .....                                                                            | Templetonia  |
| 6. Stipels clearly and consistently present .....                                                                            | 7            |
| 6. Stipels absent or inconsistently present at leaflet bases .....                                                           | 9            |
| 7. Pod jointed, separating into 1-seeded articles .....                                                                      | Desmodium    |
| 7. Pod neither jointed, nor separating into articles .....                                                                   | 8            |
| 8. Standard <21 mm long, glabrous; flowers pink to purple .....                                                              | Galactia     |
| 8. Standard >21 mm long, pubescent on back; flowers white or blue .....                                                      | Clitoria     |
| 9. Standard silky or woolly behind; pods linear or oblong, not woody;<br>herbs or shrubs .....                               | Tephrosia    |
| 9. Not as above .....                                                                                                        | 10           |
| 10. Pods breaking into articles, annual shrubs .....                                                                         | Aeschynomene |
| 10. Pods indehiscent, not articulated; trees or climbers .....                                                               | 11           |
| 11. Leaflets alternate; pods thin, neither winged nor keeled .....                                                           | Dalbergia    |
| 11. Leaflets opposite; pods either thin and winged or keeled, or rather thick .....                                          | 12           |
| 12. Pods flat, thin, winged or keeled .....                                                                                  | Derris       |
| 12. Pods flattened but thick and woody, obliquely oblong-elliptic,<br>neither winged nor keeled .....                        | Pongamia     |



## ABRUS Adans.

A pantropical genus of 17 species, with 1 species in Australia and the NT.

### **A. precatorius L.**

A deciduous perennial *vine* with twining stems. Glabrate with sparse adpressed white simple hairs throughout. *Stipules* setaceous, 2-4 mm long. *Leaves* paripinnate; rachis 40-106 mm long, stipels minute; *leaflets* in 12-19 pairs, discolorous, oblong or oblong-ovate, 7-24 mm long, 3-8 mm wide, L/W 1.3-3.4. *Inflorescence* axillary or terminal, secund, racemose, 75-160 mm long, with flowers in clusters on thickened, glandular swellings; bracts and bracteoles minute. Pedicels c. 3 mm long. *Calyx* truncate with 5 shallow lobes. *Corolla* mauve to purple, glabrous; standard sessile, ovate, 9-12 mm long. *Stamens* 9, alternately long and short. *Ovules* c. 4; style short, incurved, glabrous; stigma capitate. *Pod* pale brown, oblong, straight, raised over seeds,

30-65 mm long, 12-14 mm wide, sparsely hairy with adpressed hairs and minute colleters, apex hooked. *Seeds* 3-4, oblique in pod, separated by papery septa, red and black (rarely all black), ellipsoid, 6-9 mm long, 4.5-6 mm wide. *Flowering*: Feb - May; *fruiting*: May - Sept. Fig. 16 **Crab's Eyes**

Occurs across northern Australia, throughout the Old World tropics and introduced to S America. Common in monsoon thickets and rocky habitats. The seeds are poisonous, but are not usually dangerous because the hard seed coat prevents their digestion. Seeds are used by Aboriginal and many other societies in necklaces and other decorations including prayer beads (Levitt, 1981; Smith & Wightman, 1990; Macmillan, 1991), from which use the specific epithet is derived.

## AESCHYNOMENE L.

Erect annual shrubs or herbs with glandular based hairs. Stipules usually persistent, stramineous, peltate, prominently nerved. Leaves paripinnate, stipels absent. Leaflets asymmetric at base, discolorous. Inflorescence axillary or terminal, short, few flowered, racemose, with flowers solitary in the bract axils and subtended by bracteoles. Calyx with 2 almost free lips, the upper 2-lobed, the lower 3-lobed. Corolla glabrous (except *A. aspera*); wings lamellate (except *A. villosa*). Stamens in 2 groups of 5, filaments alternately long and short, anthers uniform, dorsifixed, versatile. Ovary stipitate; style glabrous; stigma terminal, minute or obscure. Pod stipitate, usually articulated, linear, straight, flattened, venation reticulate (except *A. aspera*), upper margin straight, lower lobed; articles indehiscent, raised over seeds. Seeds longitudinal in pod, asymmetric, reniform, usually flattened, ecarunculate.

A genus of c. 150 species, mostly in Central and S America and Africa. Six species occur in Australia, with 4 in the NT and DR. [Reynolds, 1990]

|    |                                                                                                                       |                     |
|----|-----------------------------------------------------------------------------------------------------------------------|---------------------|
| 1. | Leaflets with 1 main vein .....                                                                                       | 2                   |
| 1. | Leaflets with 2 or more main veins .....                                                                              | 3                   |
| 2. | Standard $\leq 9$ mm long; pods $< 6$ mm wide .....                                                                   | <b>A. indica</b>    |
| 2. | Standard $\geq 10$ mm long; pods $> 6$ mm wide .....                                                                  | <b>A. aspera</b>    |
| 3. | Pods glabrous, tuberculate, breaking into 1-seeded articles .....                                                     | <b>A. americana</b> |
| 3. | Pods hairy, smooth, articles breaking up to release the seeds leaving the margin of the pod entire on the plant ..... | <b>A. villosa</b>   |

### **\*A. americana L.**

*Shrub* to 1 m tall. Stems, leaf rachises and pedicels hispid; margins of stipules, leaves, bracts and

bracteoles variously ciliate. *Stipules* to 13 mm long. *Leaves* sensitive to touch, rachis (10)20-42 mm long; *leaflets* in 26-29 pairs, narrowly oblong, 4-7 mm long,

c. 1 mm wide, L/W 4-7, with 2-3 prominent nerves, base oblique, apex obliquely acute and serrulate. *Inflorescence* 11-25 mm long; bracts green, ovate, 3-5 mm long. Pedicels 5-8 mm long; bracteoles lanceolate, c. 5 mm long. *Calyx* 4 mm long. *Corolla* mauve-brown; standard suborbicular, sessile, c. 6 mm long; keel petals adhering by fimbriate margins. *Ovary* hairy on lower margin; ovules c. 8. *Pod* olivaceous to brown, straight, 15-27 mm long, 3-3.5 mm wide, glabrous; *articles* 4-7, with a raised tubercle over each seed. *Seeds* dark brown, c. 2.5 mm long, 2 mm wide. *Flowering*: Feb - May; fruiting: late Wet to early Dry season. Fig. 16

Native to Central and S America and introduced to Australia for pasture improvement. Now naturalised in the DR in suburban and rural gardens.

### **A. aspera** L.

*Shrub* to 2 m tall; when growing in water lower stems inflated, spongy and with adventitious roots. Stems glabrous to hispid, hairs dense on upper parts and inflorescence axis, calyx and corolla. *Stipules* 5-18 mm long, base truncate, almost glabrous. *Leaves* sensitive to touch, rachis 37-215 mm long; *leaflets* in 20-54 pairs, narrowly oblong or obovate-oblong, 4-14 mm long, 1.5-3.5 mm wide, L/W 2.6-5, with 1 main nerve, apex obtuse or truncate. *Inflorescence* 15-70 mm long; bracts green, ovate, 4 mm long, cordate. Pedicels 5-11 mm long; bracteoles similar to bracts, 2-3 mm long. *Calyx* 5-8.5 mm long. *Corolla* yellow to dark yellow; standard shortly clawed, orbicular, 10-20 mm long; keel petals joined along the lacinate lower margins. *Ovary* hairy; ovules 4-5. *Pod* on a stipe to 20 mm long, olivaceous to brown, 30-60 mm long, 7-10 mm wide, sparsely hairy; *articles* 3-5, corky, with muricate margins, smooth or rugose in the centre. *Seeds* dark brown, shiny, 7-8 mm long, 4-5 mm wide; hilum c. 2 mm long. *Flowering* and fruiting: Feb - May. Fig. 16

In Australia from Cape York and the northern NT, but outside Australia as far north as India. Relatively uncommon in the DR. Grows on clay soils on floodplains, often in standing water up to 1 m deep.

### **A. indica** L.

A *shrub* to 1.5 m tall. All parts except leaf surfaces and flowers sparsely to densely hairy, often viscid. *Stipules*  $\pm$  deciduous, 7-19 mm long, shortly extended

below the point of attachment, base truncate, margin sparsely serrulate. *Leaf* rachis 52-145 mm long; *leaflets* in 19-40 pairs, oblong, 2.5-9 mm long, 1-2.6 mm wide, L/W 2-4.8, punctulate above and below, with 1 main nerve, margin entire or sparsely serrulate; teeth tipped with hairs, apex obtuse or emarginate. *Inflorescence* to 40 mm long; bracts green, ovate-elliptic, c. 4 mm long, cordate. Pedicels 4-5 mm long; bracteoles similar to bracts, 2-3 mm long. *Calyx* 4.5-8 mm long. *Corolla* yellow, orange-red in centre; standard obovate, 5-12 mm long. *Ovary* hairy, ovules 8-10. *Pod* on a stipe 5-12 mm long, pale brown, 10-45 mm long, 3.5-5 mm wide, margins thickened, sparsely hairy; *articles* (1)5-8(9),  $\pm$  verrucose over seeds. *Seeds* dark brown to black, c. 4 mm long, 3 mm wide; hilum c. 1 mm long. *Flowering* and fruiting: Feb - June. Fig. 16

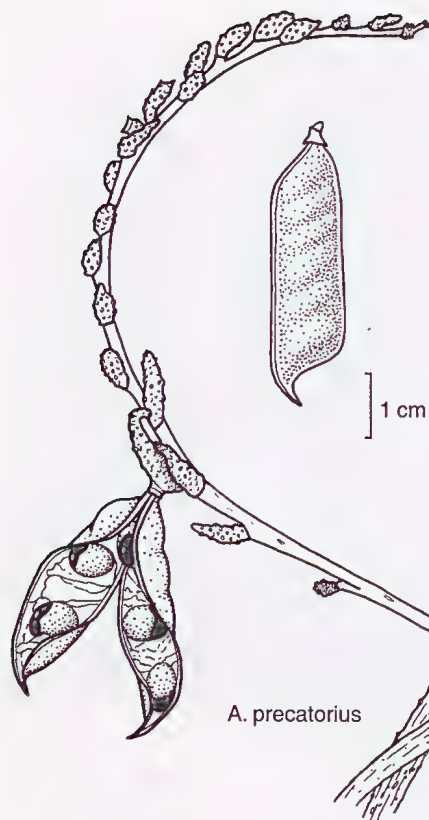
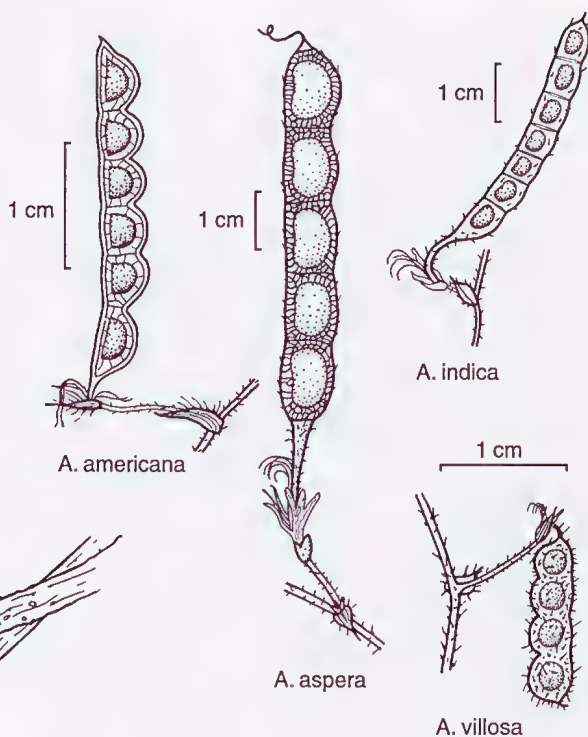
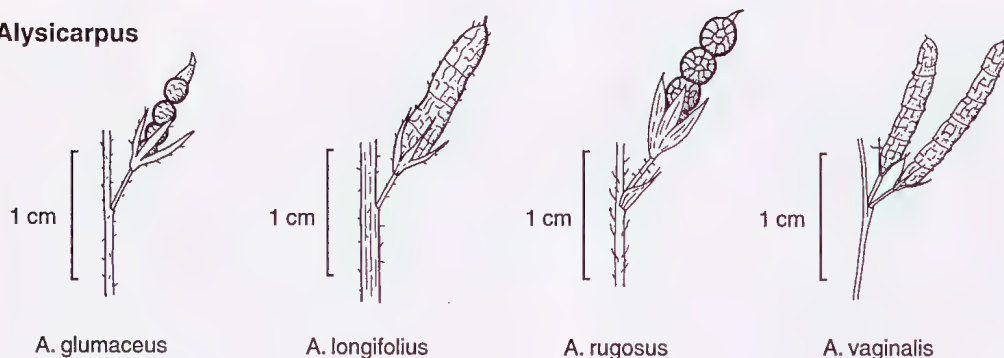
Pantropical and widespread in tropical and arid parts of Australia. Common in the DR. Grows on clay soils along water courses, on floodplains and around billabongs, often on drying mud or in shallow standing water.

### **\*A. villosa** Poiret

A decumbent or weakly erect *herb* with stems to 60 cm long. Vegetative parts with a sparse to dense covering of patent hairs or the main stems glabrous. *Stipules* 9-13 mm long. *Leaves* sometimes sensitive to touch, rachis 15-65 mm long; *leaflets* in 12-20 pairs, falcate, obovate-oblong or narrowly oblong, 4.5-9 mm long, 1.1-2.5 mm wide, L/W 3.3-5, with 3-4(6) prominent nerves, apex acute or obtuse, oblique, entire or serrulate and ciliate. *Inflorescence* to 50 mm long; bracts ovate, green, 3-5 mm long. Pedicels 5-8 mm long; bracteoles lanceolate, 3-4 mm long. *Calyx* 2-4 mm long. *Corolla* pink or orange; standard obovate, 3-5 mm long; lamellae on wings obscure. *Pod* on a stipe 2-3 mm long, pale brown, 5-18 mm long, 3.5-4 mm wide, hairy, venation faint; *articles* (1)2-6, dehiscent and breaking up to leave the empty, thickened pod margin intact on the plant. *Seeds* olivaceous to dark brown, elliptic in cross-section, 2-2.4 mm long, 1.8-2 mm wide; hilum minute. *Flowering*: Mar - June; fruiting: Apr - June. Fig. 16

Native to N and S America and introduced to Australia and Malesia. Widespread in tropical Australia, but not common in the NT. In the DR, known from the Adelaide R. and Darwin rural area. Grows in moist situations, often along sandy water courses in hilly terrain.



**Abrus***A. precatorius***Aeschynomene***A. americana**A. aspera**A. indica**A. villosa***Alysicarpus***A. glumaceus**A. longifolius**A. rugosus**A. vaginalis***Fig. 16****ALYSICARPUS Desv.**

Erect or prostrate herbs or shrubs. Stipules persistent, scarious, usually narrowly triangular, striate, glabrous, acuminate. Leaves 1-foliolate, stipels present; leaflets often variegated above, venation pinnate with prominent tertiary veins. Inflorescence terminal, leaf opposed or axillary, racemose; bracts caducous, ovate, scarious, striate, acuminate; 2 flowers per node. Calyx connate at base, appearing 4-lobed, the upper lobe bifid, striate. Corolla small, glabrous; standard without a distinct claw, obovate or spathulate. Stamens 9+1, filaments alternately long and short, anthers uniform, dorsifixed, versatile. Ovary shortly stipitate, ovules several; style geniculate and thickened in centre, glabrous; stigma capitate. Pod on stipe c. 1 mm long, articulated, stramineous, oblong-linear; articles turgid, indehiscent. Seeds longitudinal in pod, ellipsoid to oblong or rhomboid, flattened, ecarunculate.

A genus of c. 30 species distributed through the Old World tropics. Eight species are known from Australia, with 4 in the NT (all treated here) and 3 in the DR.

- |    |                                                                                                                                         |                       |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. | Pods not strongly constricted between seeds, without a sterile terminal segment; calyx lobes not overlapping, <6-nerved at centre ..... | 2                     |
| 1. | Pods strongly constricted between seeds, with a sterile terminal segment; calyx lobes overlapping at base, >6-nerved at centre .....    | 3                     |
| 2. | Leaflets <8 times longer than wide; flowers usually red, standard <5 mm long .....                                                      | <b>A. vaginalis</b>   |
| 2. | Leaflets >8 times longer than wide; flowers orange, standard >5 mm long .....                                                           | <b>A. longifolius</b> |
| 3. | Articles of fruit <2.3 mm long; calyx lobes <1.3 mm wide, 7-9-nerved at centre, bases overlapping slightly .....                        | <b>A. glumaceus</b>   |
| 3. | Articles of fruit >2.3 mm long; calyx lobes >1.3 mm wide, >10-nerved at centre, bases overlapping strongly .....                        | <b>A. rugosus</b>     |

### **A. glumaceus (Vahl) DC.**

An erect or occasionally procumbent annual *herb* to 1 m tall. Vegetative parts glabrate with minute hooked and long adpressed simple hairs on the under sides of the leaves, glabrous above. *Stipules* 4-10 mm long. *Leaf rachis* 2-4 mm long; *leaflets* elliptic at base of plant, grading to linear-lanceolate at apex, (11)32-150 mm long, 2-7 mm wide, L/W (1.5)5-33(52), base rounded to subcordate, apex acute to obtuse. *Inflorescence* to 370 mm long; indumentum of yellowish resinous simple hairs, septate glandular hairs, hooked hairs and colleters; bracts 4-6 mm long, c. 2.5 mm wide. Pedicels 3-8 mm long. *Calyx* tube 1-2 mm long, lobes narrowly elliptic, (2.5)4-5.5 mm long, 0.8-1.2 mm wide, 7-9-nerved at centre, acute, bases overlapping slightly, exceeding 2-3 lowest articles. *Corolla* yellow to yellow-orange; standard 4.5-6(8) mm long. *Ovules* 3-5. *Pod* becoming dark grey with age, constricted between articles, 4-10 mm long, 1.8-2.2 mm wide, densely covered with colleters and minute hooked hairs, transversely rugose, with a sterile apical segment; *articles* 1-5, 1.6-2.2 mm long. *Seeds* yellow-brown, elliptic to rhomboidal, 1.2-2 mm long, 1.2-1.8 mm wide. *Flowering* and fruiting: Feb - July. Fig. 16

Found in tropical Africa, India and Australia. Widespread on Cape York and in the Top End. Relatively common in the DR, usually on well drained, often skeletal soils in *Eucalyptus* dominated communities.

### **A. longifolius (Sprengel) Wight & Arn.**

An erect perennial *shrub* to 2 m tall, with annual above ground parts. Stems and leaf undersurfaces with short hyaline hooked and longer adpressed hairs, leaves glabrous above. *Stipules* 8-32 mm long. *Leaf rachis* 3-10 mm long; *leaflets* linear-lanceolate, 38-130 mm long, 2.5-9 mm wide, L/W 9.5-25, base rounded to subcordate, apex acute. Floral stems, bracts and calyx puberulous, the latter also ciliate. *Inflorescence* to 300 mm long; all parts except corolla

densely covered with hooked hairs, and also scattered simple and septate glandular hairs; bracts 5-7 mm long, c. 2.5 mm wide. Pedicels 1-3 mm long. *Calyx* tube 1.5-2 mm long, lobes lanceolate to narrowly elliptic, 3-5 mm long, 0.5-1 mm wide, 5-nerved at centre, acute, bases not overlapping, just exceeding lowest article. *Corolla* orange; standard 6-9 mm long. *Pod* subcylindrical, not constricted between articles, 13-17 mm long, 2.2-3 mm wide, slightly and irregularly wrinkled; *articles* 3-5, 3-3.5 mm long. *Seeds* not seen. *Flowering* and fruiting: Dec - Apr or later. Fig. 16

Occurs in India and in tropical Australia on Cape York and in the Top End. Apparently rare in the NT, in Eucalypt savanna and grassland.

### **A. rugosus (Willd.) DC.**

An erect or occasionally procumbent annual *herb* to 1(2) m tall. Most parts with minute hooked and strigose simple hairs, the inflorescence also with resinous colleters, leaves often glabrous above, pods with minute hooked hairs and colleters. *Stipules* 5-13 mm long. *Leaf rachis* 3-6 mm long; *leaflets* narrowly elliptic, lanceolate or rarely linear, 21-77(118) mm long, 2.5-16(23) mm wide, L/W 2.1-16, base rounded to subcordate, apex acute to obtuse. *Inflorescence* to 400 mm long; bracts 5-7 mm long, c. 2.5 mm wide. Pedicels 3-6 mm long. *Calyx* tube 1-3 mm long; lobes lanceolate to narrowly elliptic, 5-9 mm long, 1.5-2 mm wide, 12-18-nerved at centre, acute, bases overlapping, exceeding 2 lowest articles. *Standard* yellow, 5-6 mm long; wings and keel orange, red or purple. *Pod* becoming dark grey with age, constricted between articles, 11-15 mm long, 3-4 mm wide, coarsely and transversely rugose, with a sterile apical segment; *articles* 1-5, 2.5-3 mm long. *Seeds* olivaceous, yellow-brown or red-brown, ellipsoid to oblong, 2.5-3.8 mm long, 1.8-2 mm wide. *Flowering* and fruiting: Mar - Aug. Fig. 16

Found in tropical Africa, India, Malesia and tropical Australia. Widespread in parts of Qld and



the NT. Not yet known from the DR but relatively common on the Barkly Tableland and extending north to Pine Creek and the Daly R. Usually grows on clay soils on plains and along water courses.

\***A. vaginalis** (L.) DC.

*A. ovalifolius* (Schumach.) J.Leon.

A prostrate or erect annual *herb* to 50 cm tall. All parts except upper surface of leaves sparsely hairy with simple strigose white to yellowish hairs and minute hooked hairs, pod glabrate with sparse colleters. *Stipules* triangular to ovate, 3-14 mm long. *Leaf* rachis 1-9 mm long; *leaflets* typically obovate-oblong, also suborbicular, elliptic, lanceolate or ovate, 7-51(69) mm long, 5-22(30) mm wide, L/W 1.2-4.9(7), often variegated above, base cordate, apex acute to emarginate. *Inflorescence* 40-100 mm long, the internodes usually longer than the flowers; bracts 3-4 mm long. Pedicels 1-1.5 mm long. *Calyx* tube c. 1.2 mm long; lobes narrowly triangular, c. 3 mm long, 5-7-nerved,

acuminate, bases not overlapping,  $\pm$  exceeding lowest article. *Corolla* red, purple or rarely yellow; standard c. 4 mm long. *Pod* turning dark grey with age, subcylindrical, (4)9-16 mm long, c. 2 mm wide, venation raised reticulate; *articles* (1)3-7. *Seeds* greenish, mottled brown or entirely pale brown, oblong, 1.6-2.2 mm long, 1.2-1.6 mm wide. *Flowering* and *fruiting*: Feb - June. Fig. 16

**Buffalo Clover**

Widespread throughout the Old World tropics and introduced to the New World. Probably introduced to Australia and now widespread in the tropics. Common in the DR, on disturbed ground, on floodplain margins and on river banks. A useful fodder plant. Some authorities regard perennial plants with compact inflorescences and prominent reticulation as *A. vaginalis* sens. str. and annual plants with lax inflorescences and obscure reticulation as *A. ovalifolius*. Although most NT material falls into *A. ovalifolius*, some plants have inflorescence characters of *A. vaginalis*.

## AUSTRODOLICHOS Verdc.

Vines with annual stems and perennial, tuberous roots. Indumentum of simple hairs. Leaves pinnately 3-foliolate, discolorous. Stipules and stipels persistent. Inflorescence axillary, with 1-2 flowers on a peduncle; bracts persistent, linear. Peduncles slender, glandular at the apex; bracteoles persistent, broad,  $\pm$  enveloping the calyx. Calyx shallowly 5-lobed, upper pair almost entirely joined and truncate, lower lobes triangular. Corolla pink to purple, glabrous, petals clawed; standard obcordate, broad, auriculate, with 2 ridge-like parallel calli; wings obscurely lamellate, shortly adherent to keel; keel incurved. Stamens 9+1, upper stamen hooked at base; filaments alternately long and short, free parts of filaments expanded below anthers; anthers uniform, dorsifixed, versatile. Ovary sericeous; ovules numerous; style glabrous, obscurely branched at stigma. Pod linear, straight, flattened,  $\pm$  septate with pithy tissue. Seeds many, longitudinal in pod, oblong; hilum central; caruncle well developed, grooved and thickened towards the apex of the seed.

A genus of 2 species endemic to tropical Australia. The genus is scarcely distinct from the monotypic African genus *Nesphostylis* Verdc. and shows marked affinities with *Sphenostylis* E.Mey. of Africa and India. [Verdcourt, 1970]

- |                                                                 |                      |
|-----------------------------------------------------------------|----------------------|
| 1. Leaflets entire, usually ovate, rhomboidal or elliptic ..... | <b>A. errabundus</b> |
| 1. Leaflets usually lobed, linear to narrowly lanceolate .....  | <b>A. 'Kakadu'</b>   |

**A. errabundus** (Scott) Verdc.

*Vigna canescens* C.White

A slender twining *vine*. Stems softly pilose throughout, hairs retrorse on leaf rachises and peduncles, leaves thinly pilose. Bracts and calyx thinly sericeous. *Stipules* green, triangular to lanceolate, 2-4 mm long, prominently nerved. *Leaf* rachis to basal leaflets 15-50 mm, 22-61 mm overall; stipels similar to stipules, 1-3 mm long; *leaflets* ovate, rhomboidal,

elliptic to narrowly elliptic, basal pair asymmetric, 20-44 mm long, 5-25 mm wide, L/W 1.3-4, base rounded, 3 veined, margin entire, apex acute or obtuse, mucro minute. Peduncles axillary or terminal, 1(2)-flowered, 12-40 mm long; bracts c. 1 mm long, widely spaced; pedicel 5 mm long, tomentose, bracteoles ovate to elliptic, c. 4.5 mm long, obtuse. *Calyx* 5-5.5 mm long. *Corolla* mauve-pink, standard 15-24 mm long. *Pod* pale brown, 78-93 mm long,

5-7 mm wide, tomentose, apex tapering gradually. *Seeds* 9-10, mottled grey, 4.5-5 mm long, 3-3.5 mm wide, caruncle c. 2/3 length of seed. *Flowering*: Jan - Mar; *fruiting*: Mar - May. Fig. 17

Common from the DR to western Arnhem Land on well drained soils in Eucalypt savanna; also on Cape York and in the Kimberley. The tuber is eaten by Aborigines in the NT (Russell-Smith, 1985).

#### A. 'Kakadu'

Habit and stems as for *A. errabundus*. *Leaf* rachis to basal leaflets 5-35 mm, 9-44 mm overall; *leaflets* narrowly lanceolate to linear, to 50 mm long, entire or more usually with 1-2 linear basal lobes to 1/2 length of the leaflet. Other characters as for *A. errabundus*. Fig. 17

Known only from savanna in Kakadu National Park.

## BOSSIAEA Vent.

Endemic Australian genus with c. 50 species; 1 species in the NT.

#### B. bossiaeoides (A.Cunn. ex Benth.) Court

*Acacia bossiaeoides* A.Cunn. ex Benth.

A *shrub* to 2 m. *Stems* glabrous (except for axils of bracts), glaucous or green, leafless, flattened into deeply lobed cladodes 15-55 mm wide; lobes triangular, sometimes spinescent; new growth red. *Stipules* absent. *Bracts* persistent, in sinus of lobes, brown, cordate, 1.5-5 mm long. *Inflorescence* axillary, fasciculate, 1-3-flowered. *Pedicels* 4-5 mm long with persistent bracteoles c. 2 mm long. *Calyx* usually glabrous, unequally lobed, upper 2 about 5 times longer than lower 3, broad, rounded,  $\pm$  equal to length of tube, in bud adhering by marginal hairs. *Corolla* yellow; standard orbicular, 9-15 mm long, calli present, apex emarginate, sometimes with hairs on the margin and in the sinus; keel petals with upper margin hairy; wings lamellate.

*Stamens* 10, uniform, all fused, sheath open on one side; anthers dorsifixed, versatile. *Ovary* stipitate, glabrous; style glabrous, reflexed; stigma terminal, minute. *Pod* stipitate, glabrous, glaucous, red-brown, thin and flattened, oblong or irregularly constricted, 35-50 mm long, 6-10 mm wide, stiffly chartaceous to crustaceous with a fine ridge c. 1 mm from edge of upper suture, finely transversely nerved; apex acuminate. *Seeds* 6-8, longitudinal in pod, brown to olivaceous, dark spotted,  $\pm$  ellipsoid, c. 4 mm long, 2.5 mm wide; hilum central; caruncle erect-geniculate. *Flowering* and *fruiting*: most months. Fig. 17

Occurring across tropical Australia north of 18°S; known from southern parts of the DR. On sandstone or well drained sandy or lateritic soils in open vegetation.

## CAJANUS DC.

*Atylosia* Wight & Arn.

Perennial evergreen shrubs or prostrate vines. Various pubescent with simple hairs. Vesicular glands present on vegetative parts and calyx, sometimes sparse or obscure. Stipules and stipels present. Leaves coriaceous, pinnately 3-foliolate; leaflets discolorous, with 2 prominent lateral nerves, basal leaflets asymmetric. Inflorescence an axillary or terminal raceme or panicle, usually few flowered and with flowers crowded towards the distal end; bracts caducous, bracteoles absent. Calyx lobes acute, the upper 2 fused, acuminate. Corolla yellow or yellow with red or brown lines; standard glabrous, obovate or  $\pm$  orbicular, usually reflexed, auriculate, calli usually present; wings lamellate. Stamens 9+1; filaments alternately long and short; anthers uniform, dorsifixed, versatile. Ovary sericeous, ovules 2-9; style thickened above the middle, upper part glabrous or slightly hairy, not bearded; stigma terminal, capitate. Pod oblong, flattened, dehiscent, transversely depressed and septate between the seeds, apex obtuse. Seeds often mottled, oblique or transverse in pod, globular or oblong, flattened; hilum apical; caruncle conspicuous, u-shaped or cleft into 2 parts; funicle small.

A genus of 32 species occurring mainly in the Old World tropics and with 15 species in Australia. In the NT, 8 species are present with 4 species in the DR. The Pigeon Pea (*Cajanus cajan*) is an important food or fodder crop in some parts of the world and native species may be an important gene source for the development of



improved cultivars. *Atylosia* and *Cajanus* were until recently regarded as separate but are now treated as one genus. [Reynolds & Pedley, 1981; Maesen, 1985]

- |    |                                                                                                                              |                         |
|----|------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1. | Shrubs .....                                                                                                                 | 2                       |
| 1. | Slender vines .....                                                                                                          | 3                       |
| 2. | Terminal leaflet >30 mm wide, acute; tomentum usually ferruginous;<br>not aromatic .....                                     | <b>C. reticulatus</b>   |
| 2. | Terminal leaflet <30 mm wide, acuminate to acute; tomentum<br>grey-green; often aromatic .....                               | <b>C. acutifolius</b>   |
| 3. | Terminal leaflet >28 mm wide, typically rhomboidal;<br>pods mottled; stipules >2 mm wide .....                               | <b>C. marmoratus</b>    |
| 3. | Terminal leaflet <28 mm wide, lanceolate to obovate, or oblanceolate;<br>pods not mottled; stipules <2 mm wide, minute ..... | <b>C. scarabaeoides</b> |

**C. acutifolius** (F.Muell. ex Benth.) Maesen

*Rhynchosia acutifolia* F.Muell. ex Benth.

An erect *shrub* to 1.5 m tall with aromatic grey-green foliage. All parts (including pods but excepting corolla) are tomentose and usually densely vesicular glandular, the upper leaf surface often glabrate to glabrous. *Stipules* persistent, c. 1 mm long. *Leaf* rachis to basal leaflets 13-46 mm, 20-64 mm overall; stipels obscure; *leaflets* ovate to lanceolate or elliptic, 24-65 mm long, 9-25 mm wide, L/W 1.5-4.6, base cuneate or rounded, apex acuminate to acute. *Inflorescences* 1-5 per axil, of few to many flowers, to 95 mm long; bracts persistent, c. 1 mm long. Pedicels 3-6 mm long. *Calyx* 4-10 mm long; lobes as long as tube. *Corolla* yellow with red or brown stripes; standard 10-15 mm long. Style glabrous throughout. *Pod* yellow-brown, 15-21 mm long, 7-9 mm wide. *Seeds* 1-4, oblique in pod, mottled red-brown, obovoid, flattened, 4-4.5 mm long, 3-3.5 mm wide; caruncle c. 2 mm wide, cleft; funicle c. 1 mm long. *Flowering*: Jan - July; fruiting: Mar - Aug. Fig. 17

Widespread in tropical Australia; in the DR in Litchfield NP and at Mt Bunday, on or near rocky outcrops. One population from Mt Bunday has leaflets to 65 mm long and 33 mm wide and may be a separate species. The leaves are used by Aborigines as a fish poison (Russell-Smith, 1985).

**C. marmoratus** (R.Br. ex Benth.) F.Muell.

*Atylosia marmorata* R.Br. ex Benth.

A slender prostrate *vine* with annual stems and perennial roots. Stems and fruits densely pilose with long yellowish hairs mixed with short white hairs; golden vesicular glands few, sometimes apparently absent. *Stipules* persistent, cordate, 3-5 mm long, c. 3 mm wide. *Leaf* rachis to basal leaflets 12-105 mm, 20-130 mm overall; stipels setaceous, to 5 mm long; *leaflets* shortly pilose to glabrate, vesicular glands sometimes present on undersurface, base

cuneate or rounded, apex obtuse to truncate; basal leaflets obovate, 20-65 mm long, 15-50 mm wide, L/W 0.8-1.5; terminal leaflet typically rhomboidal to suborbicular, also obdeltoid or broadly elliptic, 20-105 mm long, 30-85 mm wide, L/W 0.7-1.5. *Inflorescences* 1-3 per axil, of few flowers, to 80 mm long or in panicles to 600 mm long; bracts persistent, lanceolate to 4 mm long. Pedicels 2-4 mm long. *Calyx* 7-11 mm long. *Corolla* yellow; standard 7-15 mm long. *Pod* mottled red and green, 18-27(39) mm long, 12-15 mm wide. *Seeds* (1)2-4(7), transverse in pod, mottled red-brown, globular, 4-4.5 mm long, c. 4.5 mm wide; caruncle 3-3.5 mm wide, u-shaped. *Flowering*: Jan - Sept; fruiting: Mar - Sept. Fig. 17

Widespread in tropical Australia on sandy or other well drained soils. Relatively uncommon in the DR where it is known only from southern parts usually on soils of granitic origin in open habitats.

**C. reticulatus** (Aiton) F.Muell. var. **grandifolius** (F.Muell.) Maesen

*C. grandifolius* F.Muell.; *Atylosia grandifolia* (F.Muell.) Benth.

A short-lived, erect, evergreen perennial *shrub* to 2 m tall with ribbed stems. All parts (including pods but excepting corolla) with soft dense ferruginous hairs and usually with golden vesicular glands. *Stipules* caducous, 1-2 mm long. *Leaf* rachis to basal leaflets 20-57 mm, 30-110 mm overall, stipels obscure; *leaflets* with rounded base, apex obtuse to broadly acute; basal leaflets ovate, 40-75 mm long, 24-52 mm wide, L/W 1.3-1.7, terminal leaflet broadly elliptic or ovate, 52-100 mm long, 37-67 mm wide, L/W 1.1-1.9. *Inflorescences* 1-3 per axil or in terminal panicles, of few to many flowers, to 170 mm long; bracts caducous, c. 1 mm long. Pedicels 8-16 mm long. *Calyx* 11-24 mm long. *Corolla* yellow, often with red stripes; standard 15-23 mm long. *Pod* pale brown, 30-39 mm long, 9-10 mm wide. *Seeds* (4)6-8, oblique in pod, mottled red-brown, oblong, 3.5-4 mm

long, 2.5-3 mm wide; caruncle as wide as seed, cleft; funicle c. 1 mm long. *Flowering*: Mar - Sept; *fruiting*: Jan - Sept. Fig. 17

Found in New Guinea and tropical Australia extending to southern Qld. Uncommon in the DR where known only from southern parts. Grows on sandy or other well drained soils in open habitats.

**C. scarabaeoides** (L.) Thouars var. **pedunculatus** (S.Reyn. & Pedley) Maesen

*Atylosia scarabaeoides* (L.) Benth. var. *pedunculata* S.Reyn. & Pedley

A slender prostrate vine with annual stems and perennial roots. All parts (except corolla) grey-tomentose and often densely covered with golden vesicular glands, including the upper leaf surface. *Stipules* persistent, c. 1 mm long. *Leaf* rachis to basal leaflets 9-30 mm, 14-40 mm overall; stipels minute; *leaflets* with rounded base, apex usually obtuse; basal leaflets obovate to lanceolate, 17-36 mm long, 10-15 mm wide, L/W 1.6-2.6, terminal leaflet oblanceolate,

obovate, elliptic or lanceolate, 17-60 mm long, 7-28 mm wide, L/W 1.6-3.5. *Inflorescences* 1-3 per axil, usually arising from the axil of a reduced leaf, of few flowers, to 130 mm long; bracts obscure. *Pedicels* 2-7 mm long. *Calyx* 7-8 mm long. *Corolla* yellow; standard 9-11 mm long. *Pod* pale red-brown, 15-20 mm long, 9-10 mm wide. *Seeds* (1)2-3, oblique in pod, mottled red-green, oblong, 4-5 mm long, 3-4 mm wide; caruncle almost as wide as seed, cleft. *Flowering*: Jan - May; *fruiting*: Mar - Sept. Fig. 17

Found throughout the Old World tropics and also from the West Indies. Widespread in tropical Australia, on sandy or other well drained soils in open habitats. Relatively uncommon in the DR. Although Maesen records var. *scarabaeoides* from the NT, we have seen only var. *pedunculatus*. The former has flowers almost sessile in the axils (occasionally on a rachis to 15 mm long), narrowly oblong pods containing 3-6 seeds and long hairs whilst the latter has flowers on a rachis >15 mm long and broadly oblong pods with 2-3 seeds.

## CALOPOGONIUM Desv.

A genus of c. 8 species native to tropical regions of the New World, with 1 species introduced widely in the Old World.

**\*C. mucunoides** Desv.

An annual vine, prostrate or with twining stems. All parts (except corolla) pilose with long, soft yellow-ferruginous simple hairs. *Stipules* ovate, acuminate, 4-5 mm long. *Leaves* pinnately 3-foliolate, pulvini of leaf and leaflets conspicuous, rachis to basal leaflets 50-140 mm, 62-148 mm overall; stipels linear, 3-4 mm; *leaflets* concolorous, base rounded, apex acute; basal leaflets asymmetric, ovate, 35-95 mm long, 24-90 mm wide, L/W 1-1.4; terminal leaflet ovate-elliptic, 34-100 mm long, 25-80 mm wide, L/W 1.2-1.5. *Inflorescence* nodose, axillary, racemose, to 135 mm long, with flowers clustered towards the distal ends of the rachis; bracts persistent, lanceolate, c. 5 mm long. *Pedicels* c. 15 mm long. *Calyx* 5-6 mm long; deeply 5-lobed, lobes subulate.

*Corolla* blue to purple, glabrous; standard 8-9 mm long, obovate, auriculate. *Stamens* (7-9)+1; filaments alternately long and short; anthers uniform. *Ovary* sessile, hairy; style filiform or subulate with a line of hairs along length; stigma capitate. *Pod* pale brown, linear-oblong, straight, flattened, dehiscent, 26-37 mm long, c. 5 mm wide. *Seeds* 5-7, longitudinal in pod, separated by papery septa, pale brown or yellow, rhomboid to trapezoid, angular, flattened, c. 3.5 mm long, 2.5 mm wide; ecarunculate; hilum small, round, central. *Flowering*: Apr - May; *fruiting*: June - Aug. Fig. 17

**Calopo**

A South American species widely introduced in tropical areas for pasture improvement. It is now a vigorous weed of disturbed places, often smothering supporting vegetation. Relatively common in the DR.

## CANAVALIA Adans.

Vines with perennial trailing or twining stems. Tomentum of simple hairs. Leaves pinnately 3-foliolate, concolorous, pulvini of leaves and leaflets conspicuous. *Stipules* and *stipels* present. *Inflorescence* axillary, racemose, flowers 2-3 per node, nodes enlarged and glandular, well spaced on the distal half of the



**Austrodolichos**

**Bossiaea**

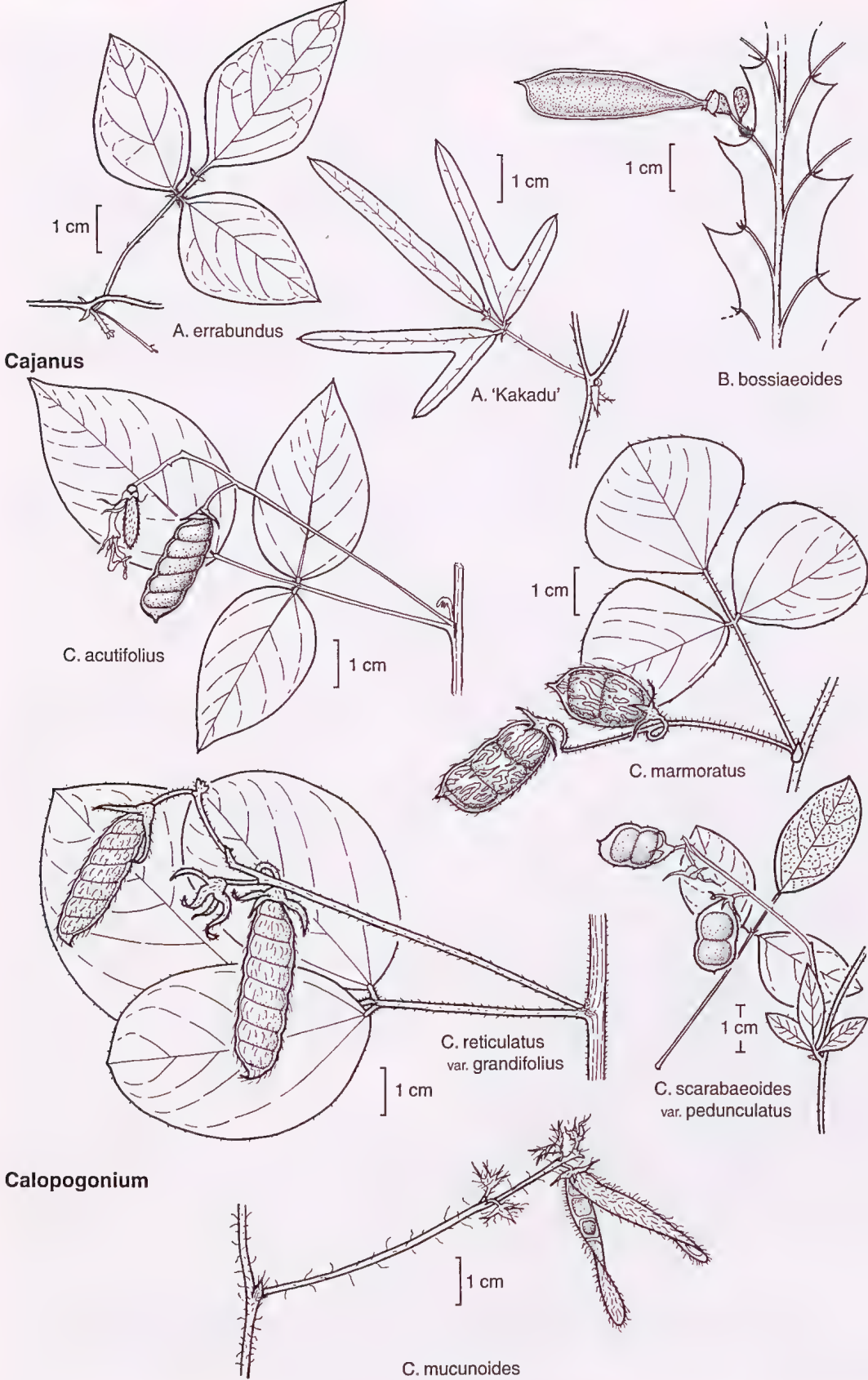


**Fig. 17**

rachis; bracteoles broad. Calyx 2-lipped, shallowly lobed, the 2 larger upper lobes broad and semicircular, the smaller lower lobes triangular. Corolla pale mauve, glabrous; standard rounded, reflexed, calli present, auriculate; wings with thickened lobes. Stamens 10, all connate in upper half, upper stamen free at base; filaments alternately long and short; anthers dorsifixed, versatile. Ovary stipitate; ovules <10; style glabrous; stigma terminal, small. Pod oblong, with a 2° rib below the top suture, septate with membranous tissue. Seeds transverse in pod, ellipsoid; hilum linear, eccentric; ecarunculate; funicle as long as hilum, rigid, persisting on pod.

A genus of c. 50 species found throughout the tropics and subtropics but principally in the New World. Of the 6 Australian species, 3 native and 1 introduced species occur in the NT and DR. *Canavalia gladiata* (Jacq.) DC. (Sword Bean) is cultivated locally and is distinguished by the red seeds and pale pods.

- |                                                                                                  |                      |
|--------------------------------------------------------------------------------------------------|----------------------|
| 1. Calyx lobes <1/4 of length of calyx; pod >35 mm wide .....                                    | <b>C. cathartica</b> |
| 1. Calyx lobes >1/4 of length of calyx; pod <30 mm wide .....                                    | <b>2</b>             |
| 2. Leaflets obtuse or emarginate; standard ≥19 mm long; plants of coastal dunes .....            | <b>C. rosea</b>      |
| 2. Leaflets acute or acuminate; standard usually <19 mm long;<br>plants of inland habitats ..... | <b>C. papuana</b>    |

### **C. cathartica** Thouars

A prostrate or climbing *vine*, glabrate throughout. *Stipules* persistent, c. 2 mm long, broad. *Leaf* rachis to basal leaflets 45-95 mm, 65-120 mm overall; stipels not seen; *leaflets* with broadly cuneate to rounded base, apex rounded, often shortly acuminate; basal leaflets slightly asymmetric, obovate or transversely elliptic, 65-97 mm long, 51-97 mm wide, L/W 0.9-1.1, terminal leaflet orbicular to obovate, 70-107 mm long, 55-109 mm wide, L/W 0.9-1.2. *Inflorescence* to 400 mm long. *Calyx* 9-10 mm long. *Corolla* purple; standard 21-30 mm long. *Pod* dark brown, broadly oblong, widest at the distal end, 87-110 mm long, 35-45 mm wide, inflated, 2° rib c. 8 mm below the top suture, indehiscent, eventually breaking up after weathering. *Seeds* 5, brown, c. 15 mm long, 11 mm wide; hilum c. 9 mm long. *Flowering*: May - July; fruiting: July - Sept. Fig. 18

Widespread in the Old World tropics. In tropical Australia, found in the northern NT and Qld on beaches or twining in coastal monsoon thickets. Rare in the NT, and in the DR known only from Bathurst Is.

### **C. papuana** Merr. & Perry

A twining *vine* with simple, sparse adpressed hairs throughout. *Stipules* knob-like, thickened, peltate, the top part caducous, c. 2 mm long. *Leaf* rachis to basal leaflets 15-50 mm, 25-95 mm overall; stipels minute; *leaflets* ovate-lanceolate to ovate-elliptic, base rounded, apex acute or acuminate; basal leaflets 37-120 mm long, 51-97 mm wide, L/W 1.5-2.2; terminal leaflet 46-145 mm long, 30-103 mm wide, L/W 1.4-1.9. *Inflorescence* to 450 mm long. *Calyx* 8-10 mm

long. *Corolla* pale mauve; standard 15-20 mm long. *Pod* pale to dark brown, oblong, flattened, 95-155 mm long, 20-28 mm wide, dehiscent, 2° rib just below the top suture. *Seeds* 5-8, olivaceous to brown, 13-17 mm long, 8-12 mm wide; hilum c. 9 mm long. *Flowering*: Jan - Sept; fruiting: July - Sept. Fig. 18

Occurs in New Guinea and tropical Australia. Found in riparian habitats, on floodplain margins and in monsoon thickets. Relatively common and widespread in the DR.

### **C. rosea** (Sw.) DC.

*C. maritima* Thouars

A prostrate *vine*, sparsely pubescent to tomentose, especially on the leaf undersurfaces. *Stipules* knob-like, thickened, peltate, the top part caducous, c. 2 mm long. *Leaf* rachis to basal leaflets 18-55 mm, 30-88 mm overall; stipels minute; *leaflets* with broadly cuneate or rounded base, apex rounded or emarginate; basal leaflets slightly asymmetric, 35-100 mm long, 20-70 mm wide, L/W 1.1-1.9(2.5); terminal leaflet obovate, deltoid or broadly elliptic, 38-102 mm long, 28-74 mm wide, L/W 1-1.6(1.9). *Inflorescence* erect from trailing stems, to 450 mm long. *Calyx* 9-11 mm long. *Corolla* mauve; standard 19-25 mm long. *Pod* on a stipe c. 8 mm long, pale brown, oblong, flattened, 100-140 mm long, 25-28 mm wide, dehiscent, 2° rib just below the top suture. *Seeds* 7-8, pale to dark brown, 14-15 mm long, 10-12 mm wide; hilum c. 6 mm long. *Flowering*: Feb - Oct; fruiting: Apr - Sept. Fig. 18

Pantropical; widespread in northern Australia. On coastal dunes. Relatively common in the DR. The seeds are used by Aborigines to make necklaces (Smith *et al.*, 1993).



## CENTROSEMA (DC.) Benth.

Twining vines. Tomentum of simple hairs and minute hooked hairs. Leaves pinnately 3-foliolate, discolorous. Stipules triangular, stipules and stipels persistent, striate. Inflorescence axillary, with 1-several flowers toward the apex of a slender peduncle; bracts caducous, striate; bracteoles connate, enveloping bud, striate, ovate. Upper pair of calyx lobes connate. Standard broadly orbicular, resupinate, pubescent on back. Stamens 9+1; filaments alternately long and short; anthers dorsifixed, versatile. Style spatulate; stigma a ciliate margin at apex of style. Pod linear, flattened, dehiscent, seeds surrounded by pithy tissue, valve margins thickened or ridged, apex caudate. Seeds  $\pm$  quadrate; hilum linear, central; ecarunculate; funicle as long as hilum, rigid, persisting on pod.

A genus of c. 50 species native to the New World. Two species are in Australia and the DR, both introduced for pasture improvement.

- |                                                                    |                     |
|--------------------------------------------------------------------|---------------------|
| 1. Leaves pubescent; flowers c. 25 mm long; pod c. 6 mm wide ..... | <b>C. pubescens</b> |
| 1. Leaves glabrate; flowers c. 40 mm long; pod >8 mm wide .....    | <b>C. plumieri</b>  |

### \*C. plumieri (Turp. ex Pers.) Benth.

Annual. Vegetative parts glabrous or nearly so. *Stipules* 7-8 mm long. *Leaf* rachis to basal leaflets 63-105 mm, 90-135 mm overall; stipels linear, 4.5-6 mm long; *leaflets* ovate to oblong; basal leaflets asymmetric, 69-105 mm long, 31-55 mm wide, L/W 1.6-2.2; terminal leaflet 70-111 mm long, 60-86 mm wide, L/W 1.1-1.4. *Inflorescence* 55-70 mm long. Pedicels 10-12 mm long; bracteoles 13-14 mm long. *Calyx* c. 5 mm long; shallowly lobed. *Corolla* pink with purple centre, standard c. 40 mm long. *Pod* dark grey to black, 100-140 mm long, 8-10 mm wide, tail 20-35 mm long. *Seeds* c. 16, reddish brown, c. 5 mm long, 3.5 mm wide; hilum c. 2/3 length of seed. *Flowering*: wet season; fruiting: late wet season to early dry season. Fig. 18

A cultivated species naturalised in West Africa and elsewhere. In the NT and DR known only from East Point, Darwin.

### \*C. pubescens Benth.

Perennial. Pubescent throughout (except pods) with hooked hairs on calyx, bracteoles and keel. *Stipules* c. 2 mm long. *Leaf* rachis to basal leaflets 15-42 mm, 24-54 mm overall; stipels filiform, c. 2 mm long; *leaflets* ovate or elliptic; basal leaflets 25-50 mm long, 13-25 mm wide, L/W 1.9-2.8; terminal leaflet 39-68 mm long, 20-35 mm wide, L/W 1.4-2.2. *Inflorescence* to 55 mm long; bracts ovate, c. 3 mm long. Pedicels c. 6 mm long; bracteoles 6-8 mm long. *Calyx* 10-11 mm long; lower lobe linear to 6 mm long. *Corolla* mauve; standard 23-25 mm long. *Pod* pale brown, the 2 sutural ribs darker, 100-117 mm long, c. 6 mm wide, tail 12-15 mm long. *Seeds* c. 20, red brown, mottled, 3-4 mm long, c. 3 mm wide; hilum c. 2 mm long. *Flowering*: May - Oct; fruiting: Sept - Oct. Fig. 18

Naturalised throughout the tropics. In Australia, in Qld, NT and WA. Common in Darwin gardens.

## CHRISTIA Moench

Tropical Australasian genus of c. 10 species; 1 species in Australia, WA and NT.

### C. australasica (Schindler) Bakh.f. ex Meeuwen

Annual or perennial slender trailing *vine* with annual aerial stems. Vegetative parts and calyx pubescent with a mixture of short patent simple hairs, micro hooked hairs and glandular based septate hairs. *Stipules* persistent, narrow, striate, c. 4 mm long. *Leaves* 1-foliolate or less often pinnately 3-foliolate; rachis 12-38 mm long; stipels persistent; *leaflets* discolorous,

slightly scabrous above, venation reticulate below; basal leaflets  $\pm$  orbicular, 8.5-14 mm diam.; terminal leaflet obdeltoid or transversely oblong or obcordate, 10-25 mm long, 15-47 mm wide, L/W 0.37-0.64. *Inflorescence* of sparsely flowered terminal and axillary racemes to 350 mm long; bracts caducous, c. 1 mm long. Pedicels 3-7 mm long; bracteoles at base of pedicels, caducous. *Calyx* equally lobed, in

flower c. 2.5 mm long, in fruit pale, membranous and reticulately veined, 7-8.5 mm long, the lobes c. 1/2 total length. *Corolla* purple, glabrous; standard not clawed, orbicular or obovate, 4-5 mm diam. Stamens 9+1; filaments alternately long and short; anthers dorsifixed and versatile. *Ovary* shortly stipitate, glabrous, 3-ovuled; style with occasional hairs at base, strongly geniculate, expanded in upper

part; stigma capitate, minute. *Pod* articulated, white or grey, concertina'd, shorter than calyx, glabrous, venation reticulate; articles 3, inflated, indehiscent, 2.5-3 mm long. *Flowering* and fruiting: Feb - June. Fig. 18

Australian endemic; usually on limestone or basalt from the Kimberley to the Katherine area. Not yet recorded from the DR.

## CLITORIA L.

Perennial shrubs or vines. Leaves pinnate or 1-foliolate, discolorous. Stipules and stipels persistent. Flowers axillary or in short axillary racemes. Bracts striate, bracts and bracteoles persistent. Calyx deeply lobed, upper pair shortly connate. Standard resupinate, large, broad, pubescent on back, without appendages. Stamens 9+1. Style elongate; stigma terminal. Pod linear, dehiscent, with pithy tissue between the seeds. Seeds longitudinal in pod; hilum small, central on the long side; caruncle pale, minute.

A genus of about 40 species of pantropical and subtropical distribution. In Australia there are 3 species (2 introduced), with 1 introduced and 1 native species in the NT and DR.

- |                                                                          |                     |
|--------------------------------------------------------------------------|---------------------|
| 1. Leaflets 1-3; flowers white; pods subcylindrical .....                | <b>C. australis</b> |
| 1. Leaflets 5-7; flowers blue, rarely almost white; pods flattened ..... | <b>C. ternatea</b>  |

### **C. australis** Benth.

A shrub to 1 m, often with twining stems. Aerial stems annual, rootstock perennial. Vegetative parts pubescent except for the upper surfaces of the leaves. *Stipules* broadly based, lanceolate, striate, 4-9 mm long. *Leaves* pinnately 3-foliolate or 1-foliolate, rachis to basal leaflets 0-40 mm, 20-63 mm overall; stipels subulate, 3-4 mm long; leaflets elliptic, elliptic-oblong or obovate; basal leaflets 40-58 mm long, 19-35 mm wide, L/W 2-2.6; terminal leaflet 49-87 mm long, 23-52 mm wide, L/W 1.4-2.2. *Inflorescence* of few to many flowers on peduncles to 25 mm long; bracts lanceolate, 3.5-5 mm long. Pedicels c. 3 mm long; bracteoles striate, ovate, 7-8 mm long. *Calyx* 15-19 mm long, covered with short hooked and scattered simple hairs; tube c. 6 mm long; lobes lanceolate. *Corolla* white; standard 22-34 mm long. *Pod* on a stipe c. 3 mm long, pale to dark brown, linear-oblong; straight, subcylindrical; 41-50 mm long, 7-8 mm wide, minutely and sparsely hairy. *Seeds* 3-6, dark red-brown, oblong-ellipsoid, slightly flattened, 5-6 mm long, 4-5 mm wide. *Flowering*: Nov - May; fruiting: Mar - May. Fig. 18

Endemic to the Kimberley and Top End of the NT. Relatively common in the DR, usually on sandy soils in Eucalypt savanna.

### **\*C. ternatea** L.

A perennial evergreen twining vine. Vegetative parts, calyx, back of standard, and pod sparsely hairy with simple and usually with minute hooked hairs. *Stipules* subulate, 3-4 mm long. *Leaves* with 2-3 pairs of leaflets, rachis to basal leaflets 12-30 mm, 38-78 mm overall; stipels filiform, c. 1.5 mm long; leaflets elliptic, broadly elliptic or ovate, 20-40 mm long, 11-28 mm wide, L/W 1.5-2.1. *Inflorescence* of 1-2 flowers in fascicles to 50 mm long; bracts narrowly triangular, c. 3 mm long. Pedicels c. 3 mm long; bracteoles foliaceous, reticulate, ovate or acute, 5-10 mm long, c. 5 mm wide. *Calyx* 15-23 mm long; tube c. 10 mm long; lobes triangular. *Corolla* dark or pale blue with a pale centre; standard 36-55 mm long. *Pod* stramineous, slightly falcate, flattened, 59-105 mm long, 9-11 mm wide, apex shortly caudate. *Seeds* 6-10, black, dull, oblong, flattened, 5.5-6 mm long, 4-5 mm wide, surface irregularly pitted; caruncle annular. *Flowering*: all months; fruiting: June - Aug. Fig. 18

### **Blue Pea**

A pantropical species introduced for pasture improvement and ornamental use and now widespread in tropical Australia. Relatively common in the DR in disturbed places.



## CROTALARIA L.

Erect annual or perennial shrubs or herbs. Tomentum of simple hairs. Stipules present. Leaves simple or 1-5-foliolate; stipels absent. Inflorescence usually terminal and racemose; bracts usually persistent; bracteoles usually persistent, often filiform and minute. Calyx sometimes 2-lipped, the 2 upper lobes sometimes almost entirely united. Flowers yellow, rarely blue; standard usually auriculate, glabrous or hairy on veins towards the apex or on the claw; wings lamellate; keel often slightly twisted, free margins often fringed with crisped hairs. Stamens 10, united in a sheath open along the upper side; anthers dimorphic, alternately long and basifixed, and short and versatile. Ovules 2-numerous; upper half of style with a fringe of hairs on the inner side; stigma terminal. Pod usually  $\pm$  oblong, inflated, dehiscent. Seeds 1-numerous, smooth, shiny, asymmetric, triangular or cordiform to reniform, flattened; hilum small; usually ecarunculate; funicle filiform, persisting on the valves.

### Rattlepods

A genus of c. 550 species widespread in the tropics and subtropics, but most numerous in Africa. Forty three species occur in Australia of which 15 are introduced. Twenty one species occur in the NT, with 11 in the DR. Eight species are known to be of varying toxicity to livestock (Everist, 1979), with *Crotalaria novae-hollandiae*, *C. medicaginea*, *C. pallida* and *C. retusa* occurring in the DR. [Lee, 1978; Polhill, 1982]

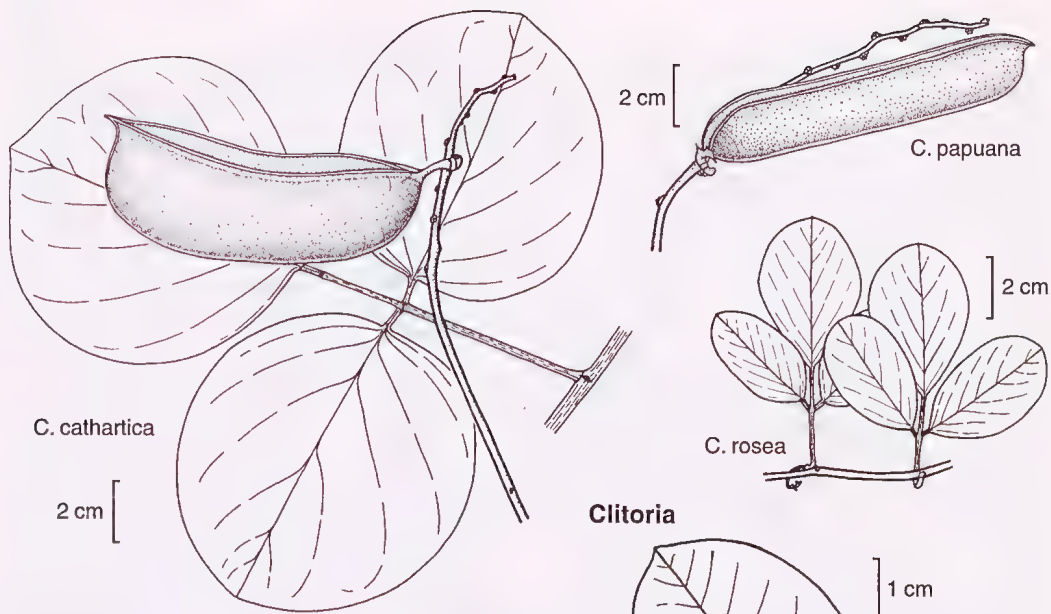
|     |                                                                                        |                            |
|-----|----------------------------------------------------------------------------------------|----------------------------|
| 1.  | Leaves simple or 1-foliolate .....                                                     | 2                          |
| 1.  | Leaves 3-foliolate or 5-foliolate .....                                                | 8                          |
| 2.  | Stipules decurrent with the stems to form a wing .....                                 | <b>C. alata</b>            |
| 2.  | Stipules free, usually narrow (rarely foliaceous) .....                                | 3                          |
| 3.  | Stems quadrangular; stipules foliaceous; flowers blue .....                            | <b>C. verrucosa</b>        |
| 3.  | Stems terete ( $\pm$ striate); stipules narrow; flowers yellow .....                   | 4                          |
| 4.  | Leaflet rachis >5 mm long, articulated .....                                           | <b>C. novae-hollandiae</b> |
| 4.  | Leaflet rachis <5 mm long, not articulated .....                                       | 5                          |
| 5.  | Calyx >15 mm long, enclosing flower and fruit .....                                    | <b>C. calycina</b>         |
| 5.  | Calyx <15 mm long, flower and pod exserted .....                                       | 6                          |
| 6.  | Pod >20 mm long; leaves (6)9-34 mm wide .....                                          | <b>C. retusa</b>           |
| 6.  | Pod <20 mm long; leaves 2-7(11) mm wide .....                                          | 7                          |
| 7.  | Plants perennial; flowers few, amongst outer foliage; leaves 5-22 mm long .....        | <b>C. brevis</b>           |
| 7.  | Plants annual; flowers numerous, on conspicuous racemes;<br>leaves 18-80 mm long ..... | <b>C. montana</b>          |
| 8.  | Leaves digitately 5-foliolate .....                                                    | <b>C. quinquefolia</b>     |
| 8.  | Leaves 3-foliolate .....                                                               | 9                          |
| 9.  | Leaflets linear .....                                                                  | <b>C. medicaginea</b>      |
| 9.  | Leaflets broad .....                                                                   | 10                         |
| 10. | Seeds orange-red; stipules foliaceous .....                                            | <b>C. goreensis</b>        |
| 10. | Seeds pale yellow; stipules narrow .....                                               | <b>C. pallida</b>          |

### **C. alata** Buch.-Ham. ex D. Don

An erect annual *shrub* to 0.5 m tall. Pilose throughout with white to ferruginous simple hairs, sometimes with slightly thickened bases. *Stipules* persistent, foliaceous, expanded and broadly or narrowly decurrent with the stem for all or part of the internode, the decurrent wings cuneate below and abruptly expanded at apex into 2 linear or triangular

lobes to 20 mm long. *Leaves* simple, slightly discolorous, oblong, linear-oblong, narrowly elliptic or oblanceolate, 12-49 mm long, 1.5-16 mm wide, L/W 2-9, base rounded or cuneate, margins recurved, apex obtuse to rounded. *Inflorescence* 1-3 flowered axillary, to 80 mm long; bracts elliptic, 1.5-3 mm long. *Calyx* 7-9 mm long; tube 1-2 mm long; lobes subulate. *Standard* 5-9 mm long. *Pod* on a stipe c. 4 mm long,

**Canavalia**



**Centrosema**

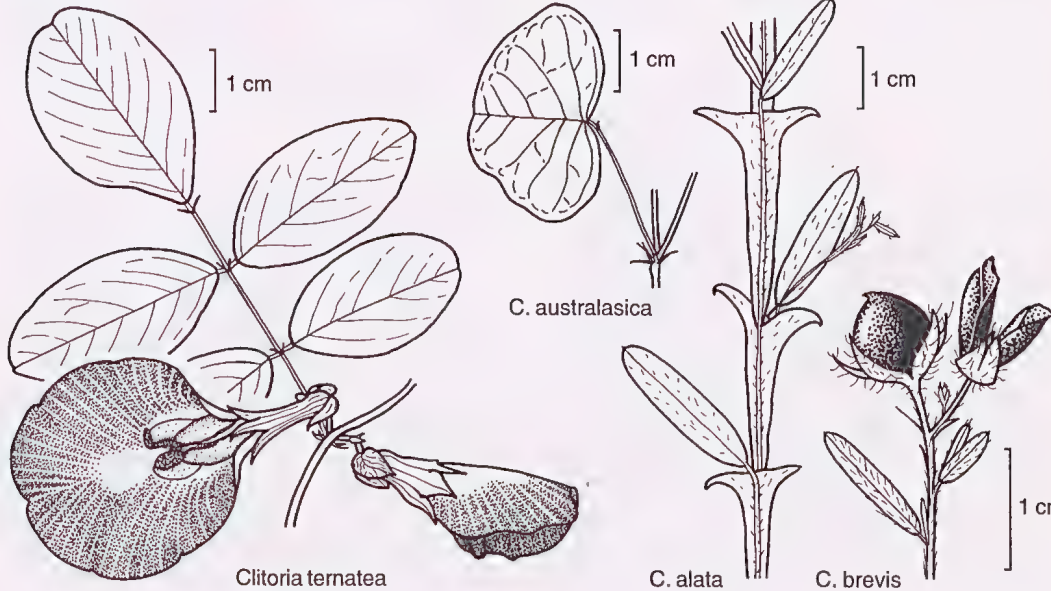
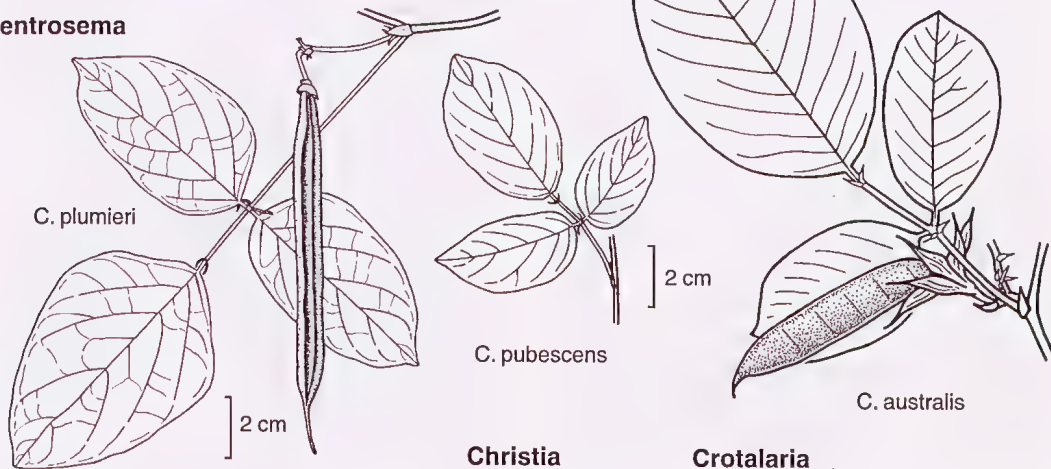


**Fig. 18**



brown, 18-40 mm long, 8-12 mm wide, glabrous. *Seeds* c. 15, yellow to pale brown, cordiform, 3-4 mm long, c. 3 mm wide; caruncle minute. *Flowering*: Feb - Apr; fruiting: Mar - June. Fig. 18

Widespread in tropical Australia, also in SE Asia and naturalised in tropical Africa. Uncommon in the DR. Usually in well drained riparian habitats.

### **C. brevis** Domin

An erect or prostrate multistemmed *subshrub* to 30 cm with annual stems and a perennial rootstock. All vegetative parts and calyx with long adpressed or occasionally patent white to ferruginous hairs. *Stipules* absent. *Leaves* simple; petioles c. 1 mm long; blades slightly discolorous, narrowly lanceolate, narrowly elliptic, linear, elliptic or rarely oblanceolate, 5-22 mm long, 2-5.5 mm wide, L/W 2-6, base cuneate or rounded, apex acute to rounded, mucro minute. *Inflorescence* 1-4-flowered, to 40 mm long, flowers often obscured by foliage; bracts linear, 1.5-4 mm long. Pedicels 2-4 mm long, bracteoles similar to bracts. *Calyx* 4.5-9 mm long, tube c. 2 mm long. *Corolla* yellow; standard 4.5-8 mm long, glabrous on back; margins of keel fringed, apex twisted. *Pod* brown, 4-10 mm long, 3.5-7 mm wide, glabrous. *Seeds* 10-18, pale yellow, brown or olivaceous, cordiform, 1.7-2.5 mm long, 1.6-2.5 mm wide. *Flowering*: Dec - July; fruiting: Jan - July. Fig. 18

Endemic to and widespread in tropical Australia. Uncommon but widespread in the DR on a variety of soils in open habitats. This taxon has previously been included in *C. montana* (as *C. linifolia* in Bentham, 1864). There are occasional specimens with longer leaves which are intermediate between *C. brevis* and *C. montana* but the majority of specimens are readily distinguished.

### **C. calycina** Schrank

An erect annual *shrub* to 1 m tall. Stems, outside of calyx and lower leaf surface villous to hirsute with hyaline to brown simple hairs to 5 mm long. *Stipules* ± persistent, subulate, 2-6 mm long. *Leaves* simple; petioles 1-3 mm long; blades discolorous, narrowly lanceolate, linear or narrowly elliptic, 35-165 mm long, 4-22 mm wide, L/W 6-20, base rounded, apex acute. *Inflorescence* axillary or terminal, 1-2-flowered, to 70 mm long, bracts narrowly lanceolate, 10-20 mm long. Pedicels reflexed, 5-10 mm long; bracteoles similar to bracts. *Calyx* 17-35 mm long, expanded when in fruit; divided almost to base; 2-lipped, 3-5-lobed, lobes narrowly elliptic to elliptic, 3-11 mm wide, exceeding corolla and fruit. *Corolla* pale yellow; standard 15-18 mm long, hairy toward

apex; keel fringed with short white crisped hairs. *Pod* dark brown, 16-22 mm long, 8-9 mm wide, glabrous, waxy. *Seeds* pale yellow, triangular, 2.3-3 mm long, c. 2 mm wide; caruncle minute. *Flowering*: Jan - June; fruiting: Feb - July. Fig. 19

Widespread in the Old World tropics, from Africa to tropical Australia. Widespread but not common in the DR. In various habitats, most commonly on moist sites fringing low lying areas. Appears to be a fire weed (Jack Cusack pers. comm.).

### **\*C. goreensis** Guill. & Perr.

An erect annual *shrub* to 1.5 m tall. All vegetative parts and calyx (except leaf upper surface) with adpressed white to hyaline short simple hairs. *Stipules* persistent, foliaceous, lanceolate, falcate, held erect, 5-20 mm long. *Leaves* digitately 3-foliolate; rachis 12-60 mm long; *leaflets* slightly discolorous, linear, narrowly elliptic, oblanceolate or obovate, base cuneate or attenuate, apex obtuse to emarginate; basal leaflets 10-43 mm long, 5-15 mm wide, L/W 2.3-5; terminal leaflet 17-70 mm long, 5-25 mm wide, L/W (1.8)3.3-4.7. *Inflorescence* crowded, to 300 mm long; bracts caducous, c. 2 mm long. Pedicels 2-3 mm long; bracteoles caducous. *Calyx* 4-5 mm long, tube 1-2 mm long; lobes narrowly triangular. *Corolla* yellow with red to brown veins, reddening with age, standard 8-10 mm long, glabrous, margins of keel densely fringed with crisped white hairs. *Pod* pale to dark brown, 15-20 mm long, 5-8 mm wide, with short adpressed hyaline hairs. *Seeds* 9-14, orange-red, darkening with age, reniform, 3-3.7 mm long, 2.8-3 mm wide. *Flowering*: Apr - May; fruiting: Apr - Sept. Fig. 19

Native to tropical Africa and introduced as a green manure to Australia where it occurs in tropical and subtropical areas. Occurs sporadically in the DR on disturbed places and in riparian habitats.

### **C. medicaginea** Lam.

*C. trifoliatrum* Willd., misapplied name

An erect annual *shrub* to 0.7 m tall. All vegetative parts and calyx with adpressed hyaline to yellow short simple hairs. *Stipules* persistent, filiform, 1-3 mm long. *Leaves* digitately 3-foliolate; rachis 1.5-11 mm long; *leaflets* slightly discolorous, linear or cuneate, 3-40 mm long, 1-6 mm wide, L/W 2-30, base cuneate, apex emarginate, or obtuse to truncate, basal leaflets slightly shorter. *Inflorescence* crowded, to 250 mm long or rarely short and axillary; bracts filiform, 1-3 mm long. Pedicels 2-4 mm long; bracteoles similar to bracts. *Calyx* 2-5 mm long; lobes narrowly triangular, c. equal in length to tube. *Corolla* yellow; standard 4-9 mm long; with adpressed hairs on back;

margins of keel densely fringed with crisped white hairs. *Pod* pale brown, ovoid to globular, 3-6 mm long, 3-5 mm wide, beaked with persistent style base, with short adpressed hyaline hairs. *Seeds* 1-2, olivaceous to pale brown, reniform, 2-2.8 mm long, 1.5-3.5 mm wide. *Flowering* and fruiting: Jan - July, occasionally at other times. Fig. 19

Found in Asia, New Guinea and Australia as far as 30° S, in open habitats on a variety of soils. Widespread but not common in the DR. Leaflets tend to be broader on plants from northern regions than on those from more inland areas.

### **C. montana L.f.**

*C. linifolia* L.f., misapplied name

An erect annual *shrub* to 1 m tall. All vegetative parts and calyx with adpressed or patent white, hyaline or slightly ferruginous simple hairs. *Stipules* obscure. *Leaves* simple; petioles c. 1 mm long; blades slightly discolorous, linear, narrowly elliptic or oblanceolate, 18-80 mm long, 2-7(11) mm wide, L/W 4-13.5, base cuneate or rounded, apex obtuse to rounded. *Inflorescence* to 250 mm long, interrupted or occasionally flowers solitary in upper leaf axils; bracts filiform, 1-3 mm long. Pedicels c. 2 mm long; bracteoles similar to bracts. *Calyx* 5.5-7 mm long; tube c. 2 mm long; upper 2 lobes almost completely connate, lower 3 lobes narrowly triangular. *Corolla* yellow; standard 4-6 mm long, with crisped hairs on claw; margins of keel sparsely fringed with crisped white hairs. *Pod* dark grey-brown, 5.5-11 mm long, 4-5 mm wide, glabrous. *Seeds* 8-12, pale yellow, brown or olivaceous, cordiform to reniform, 1.5-2.5 mm long, 1.5-2 mm wide. *Flowering*: Jan - May; fruiting: Jan - July. Fig. 19

Occurs in India, SE Asia and in tropical and subtropical Australia in open habitats on a variety of soils. Widespread in the DR.

### **C. novae-hollandiae DC.**

An erect perennial *shrub* to 1 m tall, branchlets stout, striate. All vegetative parts (except upper leaf surface) and calyx pilose to tomentose with hyaline to ferruginous short simple hairs. *Stipules* persistent, often patent or recurved, subulate, 1-4 mm long. *Leaves* 1-foliolate; rachis 6-26 mm long; petiolule 1-4 mm long; blades discolorous, obovate, narrowly lanceolate, narrowly elliptic or ovate, 31-110 mm long, 11-55 mm wide, L/W 1.6-6.6, base cuneate, attenuate or rounded, apex rounded to emarginate. *Inflorescence* crowded, to 300 mm long; bracts patent, filiform, 2-4 mm long. *Calyx* 4-9 mm long, lobes triangular, c. equal in length to tube. *Corolla* yellow; standard 8-17 mm long, glabrous on back; keel twisted

at apex, margin of keel glabrate. *Pod* dark or pale brown, or stramineous, obovoid, 12-30 mm long, 7-10 mm wide, glabrous. *Seeds* 6-10, pale yellow to pale brown, cordiform, 3.5-6 mm long, 3-5 mm wide. *Flowering* and fruiting: mostly Jan - July. Fig. 19

An Australian endemic widespread in the monsoonal and semiarid tropics. Occurs on a variety of soils in open habitats but frequently on disturbed areas, skeletal soils or on alluvium. Rare in the DR but common to the south. Two subspecies are known. *Crotalaria novae-hollandiae* subsp. *novae-hollandiae* has leaves with narrow, tapering bases while subsp. *lasiophylla* has leaves with cordate or truncate bases. Only the former subspecies is known from the DR. This description does not include *C. crassipes* Hook. which we regard as a separate species.

### **\*C. pallida Aiton**

An erect annual *herb* to 1 m tall. All vegetative parts and calyx (except leaf upper surface) with sparse adpressed white short hairs. *Stipules* persistent, minute. *Leaves* digitately 3-foliolate; rachis 32-60 mm long; leaflets discolorous, elliptic or obovate, 40-85 mm long, 23-50 mm wide, L/W 1.6-2, upper surface vesicular glandular, base attenuate, apex emarginate; basal leaflets subequal to terminals. *Inflorescence* to 350 mm long, flowers reflexed; bracts caducous, filiform, 3-4 mm long. Pedicels c. 5 mm long; bracteoles caducous. *Calyx* c. 5 mm long; lobes as long as tube. *Corolla* pale yellow with red to brown veins; standard 8-12 mm long; margins of keel fringed with crisped white hairs. *Pod* stramineous, c. 36 mm long, c. 7 mm wide, sparsely hairy to glaucous. *Seeds* c. 50, pale yellow, reniform, c. 3.2 mm long, 2.5 mm wide. *Flowering*: Dec - May; fruiting: May. Fig. 19

Pantropical and introduced to Australia (NT and Qld). In the NT known mainly from disturbed places in the DR.

### **C. quinquefolia L.**

An erect annual *herb* to 1 m tall with striate stems. Vegetative parts (except leaf upper surface) with adpressed white short hairs. *Stipules* persistent, narrowly lanceolate, 3-5 mm long. *Leaves* digitately 5-foliolate; rachis 15-65 mm long; leaflets discolorous, unequal, linear or very narrowly elliptic, 25-95 mm long, 3-8 mm wide, L/W 6-16, upper surface vesicular glandular, base attenuate, apex rounded to acute or emarginate. *Inflorescence* to 280 mm long; bracts narrowly lanceolate, 5-8 mm long. Pedicels 6-14 mm long; bracteoles on lower part of pedicel. *Calyx* 9-10 mm long, glabrous; lobes triangular, as long as tube. *Corolla* yellow,



with red-brown veins; standard 14-19 mm long, glabrous; margins of keel fringed with crisped white hairs in lower half, apex twisted. *Pod* stramineous to grey, reflexed, obovoid-oblong, 50-65 mm long, 19-20 mm wide, glabrous. *Seeds* 34-48, red-brown, cordiform, c. 4.5 mm long, 3.5 mm wide. *Flowering*: Feb - Mar; fruiting: Mar. Fig. 19

Found in the Old World tropics from India to Australia. Occurs in the Top End of the NT and in north Qld on black soil floodplains, often in shallow water. Rare in the DR where known only from the Adelaide and Finnis Rivers.

### **C. retusa L.**

An erect annual or short-lived perennial *shrub* to 1.5 m tall, branchlets striate. All vegetative parts (except upper leaf surface) and calyx with closely adpressed grey short hairs. *Stipules* persistent, filiform, 1-1.5 mm long. *Leaves* simple; petioles 2-3 mm long; blades discolorous, obovate or oblanceolate, 20-141 mm long, 6-34 mm wide, L/W 2.5-6.4, vesicular glandular above, base attenuate or cuneate, apex rounded to emarginate. *Inflorescence* to 360 mm long; bracts narrowly triangular, 2-3 mm long. Pedicels 5-10 mm long; bracteoles medial on the pedicel. *Calyx* 9-14 mm long; lobes triangular, 1-2 times as long as tube. *Corolla* yellow tinged reddish; standard 12-23 mm long, main vein hairy; keel twisted at apex; free margins of keel densely fringed with crisped hairs. *Pod* grey-brown, obovoid-oblong, 25-41 mm long, 10-12 mm wide, glabrous, subglaucous. *Seeds* 14-20, pale yellow, cordiform, 4.5-5.5 mm long, 3.5-4.5 mm wide. *Flowering*:

Dec - Sept.; fruiting: Feb - Nov. Fig. 19

Pantropical and widespread in tropical Australia. Grows in open habitats, often associated with disturbance. Relatively uncommon in the DR. Causes Kimberley Horse Disease or Walkabout Disease in horses (Everist, 1979).

### **C. verrucosa L.**

An erect annual or perennial *herb* to 1 m tall, stems quadrangular. All vegetative parts and calyx with adpressed to patent white to brown short hairs. *Stipules* persistent, foliaceous, subulate, strongly falcate, 5-30 mm long, 2-9 mm wide. *Leaves* simple; petioles 4-10 mm long; blades discolorous, obovate, deltoid, ovate, suborbicular or lanceolate, 45-175 mm long, 15-100 mm wide, L/W 1.1-3, base attenuate, apex emarginate, acute or obtuse. *Inflorescence* to 270 mm long; bracts filiform, 2-6 mm long. Pedicels 5-9 mm long; bracteoles on pedicels. *Calyx* 7-12 mm long; lobes triangular, c. 2 times as long as tube. *Corolla* pale blue to purple with darker veins; standard 11-20 mm long, main vein sparsely hairy; keel twisted at apex, free margins of keel fringed with crisped hairs. *Pod* pale to dark brown, subcylindric, slightly falcate, 40-80 mm long, 9-13 mm wide, with patent soft hairs, sometimes resinous inside. *Seeds* 20-32, pale brown, reniform, 4.5-5 mm long, 3.5-4 mm wide. *Flowering*: Feb - Aug; fruiting: Mar - Aug. Fig. 19

Found in the Old World tropics from India and China to Australia. Widespread in tropical Australia, often growing along water courses. In the DR known only from among granite boulders at Mt. Bunday.

## **CYCLOCARPA K.Afzel. ex Baker**

A monotypic genus occurring sporadically through the Old World tropics, including tropical Australia, but not common in the NT. [Reynolds, 1990]

### **C. stellaris K.Afzel. ex Baker**

A decumbent or prostrate annual *herb* to 30 cm tall. Glabrous throughout, except for rigid minute hairs on the under side of the leaf rachis and margin of the pod. *Stipules* brown, membranous, produced equally above and below the point of attachment, 5-7.5 mm long, striate. *Leaves* alternate, paripinnate, sensitive to touch; rachis to basal leaflets <1 mm, 3-10 mm overall; stipels absent; leaflets in 2-4 pairs, slightly discolorous, obovate-oblong, 5-8.5 mm long, 2-2.7 mm wide, L/W 2-3.2 mm, punctulate, base oblique, margins finely serrulate toward apex, apex obtuse or

rounded, apiculate, *Flowers* 1-2 in axillary fascicles; bracts persistent, brown, narrow, c. 1.3 mm long, membranous, striate. Pedicels c. 2.5 mm long with a bract at base and 2 bracteoles at distal end; bracteoles like bracts, ovate. *Calyx* caducous, 3-4 mm long; deeply 2-lipped, obscurely lobed. *Corolla* yellow; standard c. 3 mm long, shortly clawed; wings with a few transverse lamellae. *Pod* articulated, dark brown, flattened, coiled, 4-5 mm diam.; articles 6-13, truncate-triangular, glabrous. *Seeds* olivaceous, stramineous to brown, asymmetric, triangular, 0.7-1.2 mm long, 0.7-1 mm wide; hilum minute,

**Crotalaria**

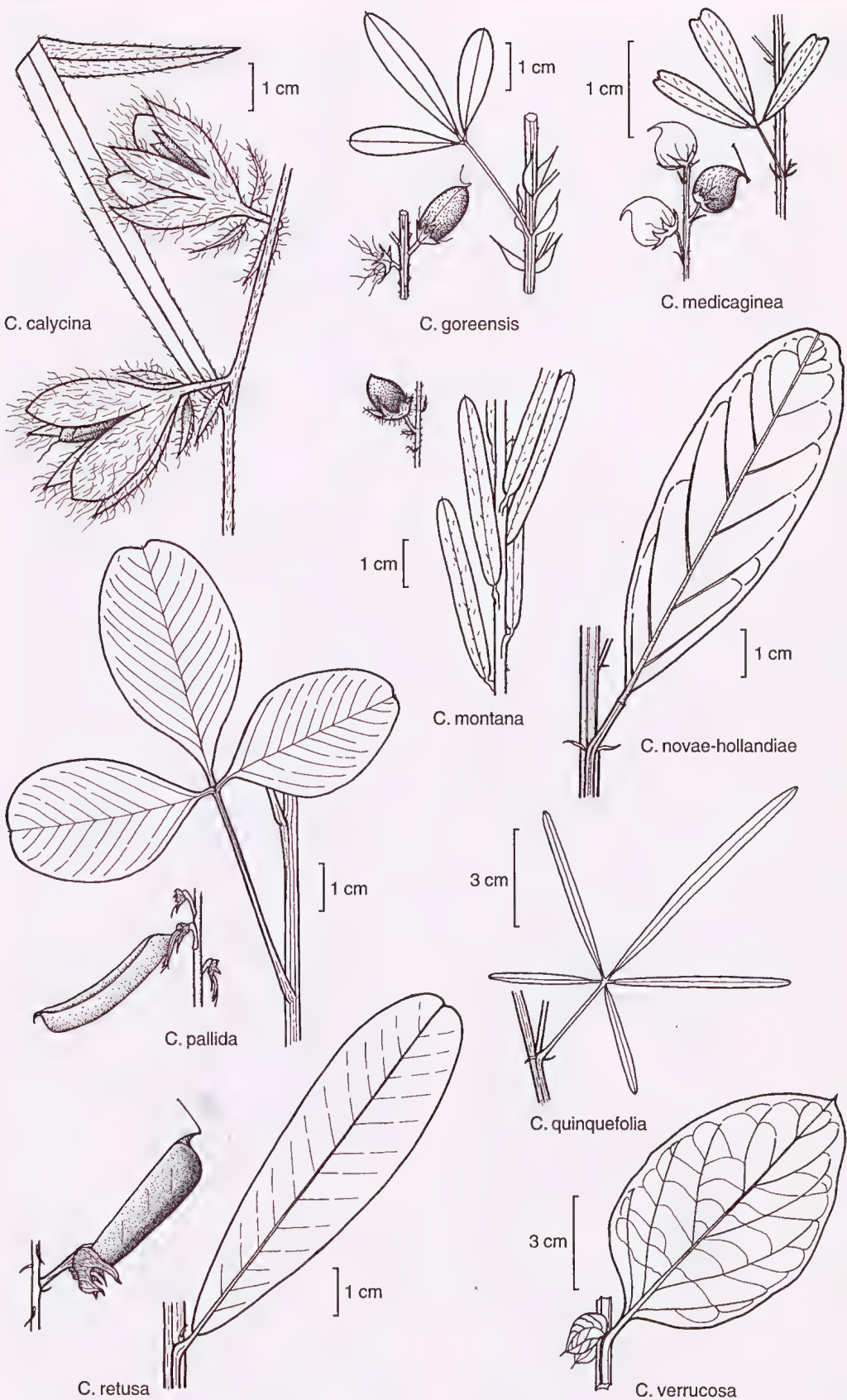


**Fig. 19**



eccentric; ecarunculate. *Flowering*: Mar - Apr;  
*fruiting*: Apr - May. Fig. 20

Typically occurs on the margins of floodplains  
 and in moist situations. Uncommon in the DR.

## DALBERGIA L.f.

Evergreen vines or trees with smooth bark. Stipules caducous, minute. Leaves pinnate, with a terminal leaflet; leaflets alternate, discolorous; stipels absent. Inflorescence axillary, racemose or paniculate, short; bracts and bracteoles small, usually caducous. Calyx 5-lobed, 2-lipped, upper 2 lobes connate, lobes 1/2 as long as tube. Corolla glabrous, petals long-clawed; wings free; keel petals adhering just below tip. Stamens 9-10, united; anthers uniform. Ovary stipitate; ovules 1-2; style glabrous, incurved. Pod 1-2-seeded, stipitate, thin, flattened, indehiscent, reticulately veined.

A genus of c. 100 species found throughout the tropics. One native and 1 introduced species occur in the NT and DR with an additional native species in Qld.

- |                                           |                         |
|-------------------------------------------|-------------------------|
| 1. Vine; leaflets 5-8; pod falcate .....  | <b>D. candenatensis</b> |
| 1. Tree; leaflets 3-5; pod straight ..... | <b>D. sissoo</b>        |

### **D. candenatensis** (Dennst.) Prain

A perennial *vine*; bark smooth, purple, shiny. All parts except calyx with adpressed ferruginous glandular based minute hairs, becoming glabrescent with age. Branchlets modified to form climbing coils. *Leaves* often on short lateral shoots; rachis to basal leaflets 16-24 mm, 20-75 mm overall; pulvini 2-3 mm long; *leaflets* 5-8, obovate or elliptic, 15-52 mm long, 11-34 mm wide, L/W 1.4-2.4, undersurface of young leaves minutely papillose-glaucous, base rounded, apex obtuse or emarginate. *Inflorescence* racemose or paniculate, to 30 mm long; bracts persistent, ovate, c. 1 mm long. Pedicels c. 2 mm long; bracteoles suborbicular, 1.5-2 mm long. *Calyx* c. 3 mm long; lobes obtuse. *Corolla* white; standard 4-4.5 mm long. *Pod* on a stipe 2.4-4 mm long, brown, falcate, 20-35 mm long, 13-15 mm wide, glabrous, base attenuate. *Seeds* 1-2, not seen. *Flowering*: Feb (1 record); *fruiting*: Nov (1 record). Fig. 20

A widespread species occurring from India to China and extending to northern Qld and the NT. Grows in strand vegetation and at the rear

edge of mangroves. Uncommon in the DR. [Wightman, 1979]

### **\*D. sissoo** Roxb.

A *tree* to 9 m tall; bark smooth, grey. Stems, inflorescence branches and calyx with a white minute indumentum, leaflets glabrescent. *Leaf* rachis to basal leaflet 16-30 mm, 31-70 mm overall; *leaflets* 3-5, obovate or suborbicular, 25-80 mm long, 23-54 mm wide, L/W 1-1.5, base attenuate, apex acuminate. *Inflorescence* paniculate, to 50 mm long; bracts minute. Pedicels c. 1 mm long, bracteoles minute. *Calyx* 5-6 mm long; lobes unequal. *Corolla* pale yellow; standard 8-9 mm long; wings lamellate. Ovary hairy; style with scattered hairs. *Pod* on a stipe c. 8 mm long, stramineous, narrowly elliptic to linear, straight, 33-59 mm long, 7-10 mm wide, glabrate. *Seeds* 1-2, brown, reniform, c. 4 mm long, 2 mm wide; hilum linear, c. 2 mm long; ecarunculate. *Flowering*: Apr; *fruiting*: Apr and Dec. Fig. 20

Native to northern India and cultivated elsewhere. Possibly naturalised in the DR and forming dense thickets under some conditions.

## DAVIESIA Sm.

Endemic to Australia with about 100 species, mostly in south west WA; 4 in the NT, 1 (*D. reclinata*) in the Top End but not known from the DR.

### **D. reclinata** R.Br. ex Benth.

A prostrate or semi-erect evergreen *shrub* to 2 m

high; glabrous throughout; stems angular. *Stipules* caducous, minute, obscure. *Leaves* simple, sessile,

linear-oblongate to narrowly oblanceolate, 40-140 mm long, 1-8 mm wide, L/W 11-40; venation obscure except for main vein. *Inflorescence* terminal or axillary, racemose, to 120 mm long, the flowers well spaced; bracts small, persistent. Pedicels 4-10 mm long, bracteoles absent. *Calyx* 4.5-7 mm long; lobes 5, the 2 upper longer, rounded or blunt, ribbed, resinous, especially in fruit, c. 1/3 total length. *Corolla* yellow, glabrous; standard broader than long, clawed, reflexed, emarginate, with large calli, 7-9 mm long; wings and keel long-clawed; wings lamellate; keel

petals pouched, joined towards apex. *Stamens* 10; alternately thick with long basifixed anthers and thin with shorter versatile anthers. *Ovary* 1-2-ovuled, glabrous; stigma minute. *Pod* triangular, stiff, sub-woody, brown with a resinous sheen; 11-15 mm long, 5-7 mm wide. *Seed* 1, brown or mottled black and red, 4.1-4.5 mm long, 2.5-2.7 mm wide; caruncle asymmetric. *Flowering* and fruiting: most months. Fig. 20

Endemic to the Kimberley and Top End of the NT; usually on sandstone or soils derived from sandstone.

## DENDROLOBIUM Benth.

Perennial subshrubs or herbs with annual above ground parts. Indumentum of short adpressed and minute hooked hairs. Stipules persistent. Leaves pinnately 3-foliolate, rarely 1-foliolate; stipels persistent; leaflets discolorous, dorsiventral, strongly penniveined, undersurface often prominently reticulate. Inflorescence axillary, fasciculate; bracts and bracteoles similar, narrow, small. Calyx persistent, 4-lobed, lobes as long as tube, acuminate, upper lobe minutely bifid to entire. Standard shortly clawed; wings lamellate. Stamens 9+1, upper stamen free or partly connate to sheath; anthers uniform, basifixed. Ovary sessile, densely hirsute; ovules 1-5; style hairy towards base; stigma capitate. Seeds longitudinal in pod, reniform, strongly flattened; hilum central; ecarunculate.

A genus of c. 12 species in tropical Asia and tropical Australia. Of the 3 Australian species, 2 occur in the NT and DR. This genus is sometimes treated as a subgenus of *Desmodium*.

1. Plants erect; basal leaflets >1/2 length of terminal leaflet;  
upper stamen connate to sheath in lower half ..... **D. stipatum**
1. Plants prostrate; basal leaflets <1/2 length of terminal leaflet;  
upper stamen free to base ..... **D. 'Green Ant Ck'**

### **D. stipatum** S.T.Blake

An erect multistemmed *subshrub* to 0.6 m tall, with grey-green foliage. Pubescent throughout with adpressed white to brown short hairs and minute hooked hairs; a globular yellow exudate darkening with age on all parts. *Stipules* 3-4 mm long, acuminate. *Leaf* rachis to basal leaflets 6-18 mm, 10-34 mm overall; *leaflets* elliptic, ovate, obovate or lanceolate, veins in 6-11 pairs, undersurface glaucous-papillose, base rounded or cuneate, apex emarginate; basal leaflets 17-63 mm long, 11-28 mm wide, L/W 1.4-2.4, >1/2 length of terminal; terminal leaflet 34-75 mm long, 17-37 mm wide, L/W 1.6-2.3. *Inflorescence* of up to 11 flowers; bracts caducous, 1-2 mm long. Pedicels slender, 6-14 mm long. *Calyx* 4-6 mm long. *Corolla* pink; standard 9-14 mm long. Upper stamen connate to sheath in lower 1/2. Ovules (1)2-5. *Pod* articulated, brown, oblong, falcate, flattened, 18-32 mm long, 4-5 mm wide, venation reticulate, articles dimidiate, 6-7 mm long, 4-5 mm

wide. *Seeds* pale brown, 3.5-5 mm long, 2.3-3 mm wide; hilum c. 1 mm long. *Flowering*: July - Oct; fruiting: Oct. Fig. 20

Endemic to the DR and found in the Batchelor - Litchfield - Daly R. area. Grows in *E. confertiflora* - *E. foelscheana* woodland, often on stony soil.

### **D. 'Green Ant Ck'**

A prostrate *herb*. Stems to 1.3 m long, foliage often ground hugging. Adpressed to patent white hairs and minute hooked hairs on all parts except corolla, upper leaf surface often glabrate. *Stipules* 5-7 mm long, striate, acuminate to attenuate. *Leaf* rachis to basal leaflets 9-35 mm, 17-55 mm overall; *leaflets* ovate, orbicular or broadly elliptic, veins in 11-16 pairs, base rounded or cordate, apex acute to obtuse; basal leaflets 25-47 mm long, 15-35 mm wide, L/W 1-1.8,  $\pm$  asymmetric, <1/2 length of terminal; terminal leaflet 63-104 mm long, 35-60 mm wide, L/W 1-1.9. *Inflorescence* of up to 20 flowers in leaf axils, leaves



often reduced or absent thus forming a long raceme-like terminal inflorescence; bracts persistent, c. 2 mm long. Pedicels 3-11 mm long. *Calyx* 4-7 mm long. *Corolla* white to faintly pink; standard 6-10 mm long, straight; keel pouched at base, shortly connate towards apex. Upper stamen free to base. Ovules 1-2. *Pods* brown, dimidiate, flattened, 6-7 mm long, 4-5 mm

wide, venation obscure. *Seed* 1, pale brown, c. 4 mm long, 2.5 mm wide, smooth; hilum c. 0.5 mm long. *Flowering*: Aug - Mar; fruiting: Feb - Apr. Fig. 20

Endemic to the western Top End between Katherine and Batchelor. Relatively common in the DR. Grows on a variety of soil types in Eucalypt savanna.

## DERRIS Lour.

About 50 species in tropical and subtropical regions; the majority of species in Asia. The 4 Australian species mostly occur in Qld, with 1 species extending to the NT and the DR. [Wightman, 1989]

### *D. trifoliata* Lour.

*D. uliginosa* (DC.) Benth.

Evergreen vine, the old stems brown with pale circular corky lenticels, often rooting adventitiously. All parts (except ovary) glabrous or nearly so. *Stipules* persistent, broad-triangular, minute. *Leaves* imparipinnate, (1)3-5-foliolate; stipels persistent, decurrent with ribs on rachis, minute; rachis to basal leaflets 25-75 mm, 50-125 mm overall; leaflets lanceolate or ovate, 55-150 mm long, 25-64 mm wide, L/W 2-2.7, base shortly cordate, apex acuminate. *Inflorescence* terminal or axillary, often on old wood, a raceme-like panicle, the flowers on short lateral branches off the main axis; to 235 mm long; bracts persistent, minute. Pedicels 2-4 mm long; bracteoles persistent, minute, just below calyx. *Calyx* cupular, c. 3.5 mm long; shallowly 5-lobed. *Corolla* white or pink; petals clawed; standard  $\pm$

as broad as long, 7-10 mm long, emarginate; keel petals shortly fused towards apex. *Stamens* 9+1, the upper stamen slightly adhering to sheath just above base; anthers uniform, dorsifixed and versatile. *Ovary* sessile, thinly hairy with long simple hairs; ovules 4-7; *style* glabrous, curved; stigma small, terminal. *Pod* olivaceous, indehiscent, flat, oblong or orbicular, 30-55 mm long, 30-35 mm wide, venation reticulate. *Seeds* brown, 1-2, broadly reniform. *Flowering*: Aug - Nov; fruiting: Nov - Dec. Fig. 20

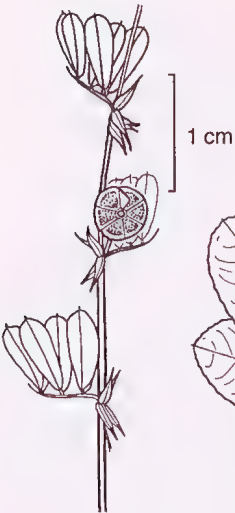
Occurs from Africa through Asia to northern Australia (NT and Qld). A mangrove species; in the DR known from the Adelaide R. This and other *Derris* species have been used as fish poisons and contain the chemical rotenone, the active ingredient in the insecticide Derris dust (Burkill, 1966; Wightman, 1989).

## DESMODIUM Desv.

Annual or perennial shrubs or herbs. Stipules usually persistent, striate, attenuate. Indumentum variously of minute, short or long hooked, simple or glandular-septate hairs. Leaves 1-foliolate, pinnately 3-foliolate or apparently digitately 3-foliolate, discolorous; stipels persistent, usually minute, basal leaflets usually subequal to terminal. Inflorescence terminal or axillary, usually racemose, rarely paniculate or fasciculate; bracts caducous or persistent, striate, attenuate, similar to stipules; bracteoles present or absent. Calyx lobes 5, or 4 with the upper lobe shallowly or deeply bifid. Corolla yellow, pink-purple or white, glabrous; standard rarely with calli; wings usually without lamellae,  $\pm$  adhering to keel; keel usually incurved, lower margins of keel petals variously adhering towards apex, obtuse. Stamens 9+1, upper stamen sometimes variously adhering to the sheath to form a partial tube; filaments alternately long and short; anthers uniform, fixed near base, versatile. Ovary sessile, usually hairy; ovules 1-8; style inflexed or incurved, glabrous or rarely hairy in lower half; stigma terminal, capitate. Pod articulated, straight or curved, oblong, usually flattened, venation usually prominently reticulate; articles usually indehiscent, less commonly dehiscent along the lower suture. Seeds longitudinal in pod; hilum mostly central and usually with a minute brown annulus; ecarunculate.

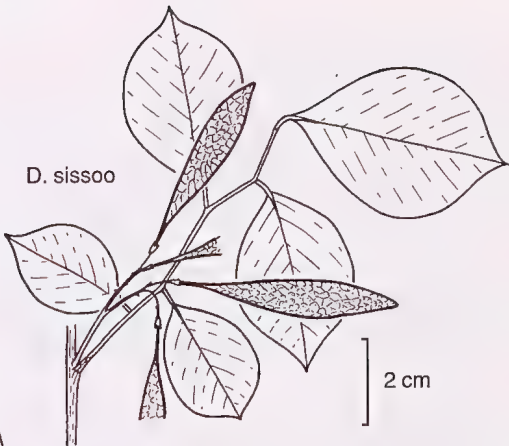
A genus of c. 300 species found in tropical and subtropical areas. About 28 species occur in Australia with 15 species known from the DR. All 19 species known from the NT are treated in this account.

**Cyclocarpa**

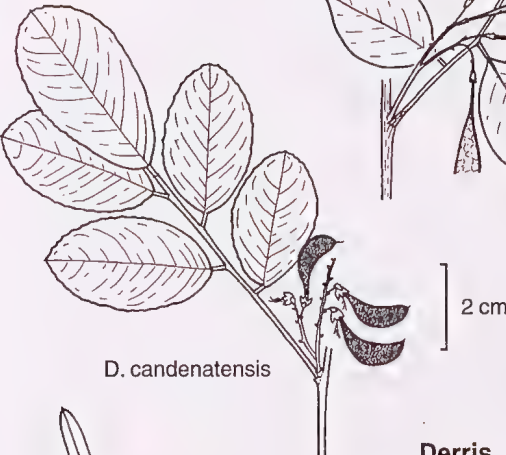


*C. stellaris*

**Dalbergia**

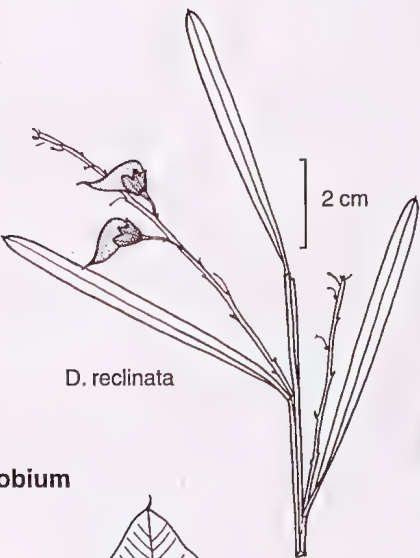


*D. sissoo*



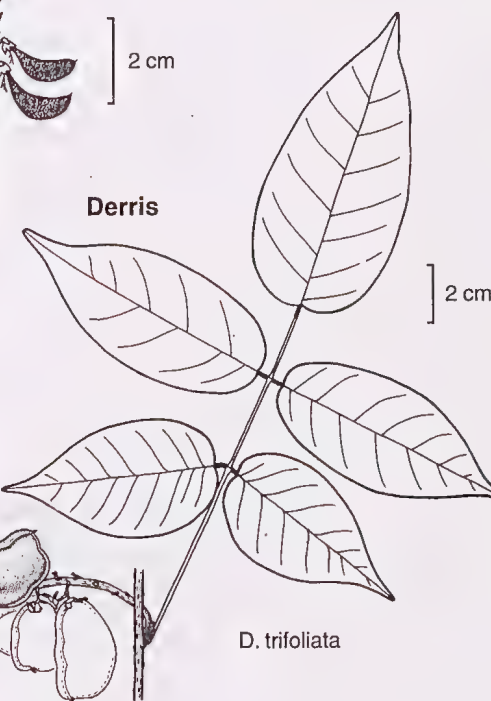
*D. candenatensis*

**Daviesia**



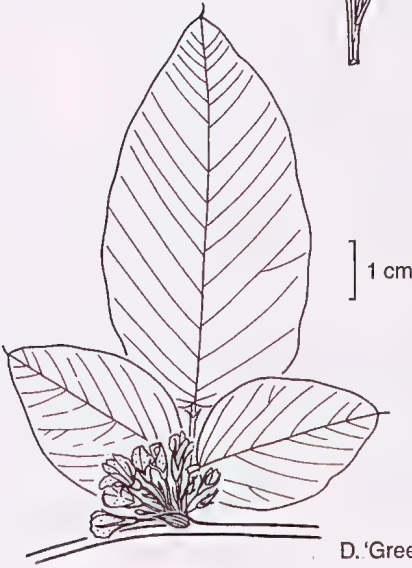
*D. reclinata*

**Derris**

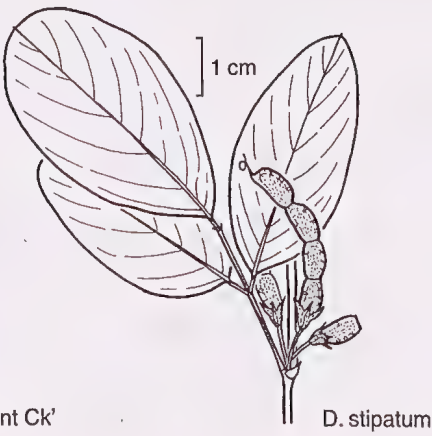


*D. trifoliata*

**Dendrolobium**



*D.* 'Green Ant Ck'



*D. stipatum*



|     |                                                                                                                                            |                          |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1.  | Flowers in racemes or panicles .....                                                                                                       | 2                        |
| 1.  | Flowers in fascicles in the upper leaf axils .....                                                                                         | 22                       |
| 2.  | Stipules caducous; plants silvery, densely clothed in adpressed simple<br>crisped hairs; standard >9 mm long; calyx >5 mm long .....       | <b>D. polyneurum</b>     |
| 2.  | Stipules persistent; plants not silvery, indumentum of other hair types;<br>standard <8 mm long; calyx <5 mm long .....                    | 3                        |
| 3.  | Plants erect, >60 cm tall, usually shrubby; inflorescences usually<br>densely flowered .....                                               | 4                        |
| 3.  | Plants prostrate or spreading, or if erect <60 cm tall, herbaceous;<br>inflorescences interrupted or few flowered .....                    | 11                       |
| 4.  | Leaves 1-foliolate .....                                                                                                                   | 5                        |
| 4.  | Leaves predominantly 3-foliolate .....                                                                                                     | 6                        |
| 5.  | Upper margin of pod entire, articles 4-5; all parts velutinous .....                                                                       | <b>D. velutinum</b>      |
| 5.  | Both margins of pod constricted, articles 5-8; all parts pilose to glabrescent .....                                                       | <b>D. gangeticum</b>     |
| 6.  | Each cluster of flowers subtended by a leaf of 2 ± orbicular<br>leaflets 10-20 mm long .....                                               | <b>D. pulchellum</b>     |
| 6.  | Flowers or clusters subtended only by scarious bracts <8 mm long<br>which are often caducous .....                                         | 7                        |
| 7.  | Stipules connate on both margins, forming a 3-4-fid tube; articles 1-2 .....                                                               | <b>D. biarticulatum</b>  |
| 7.  | Stipules free or connate only on one margin, apex not lobed;<br>articles usually >2 .....                                                  | 8                        |
| 8.  | Articles 1-3, with straight hairs only .....                                                                                               | <b>D. pulchellum</b>     |
| 8.  | Articles 3-8, with hooked hairs, straight ± present .....                                                                                  | 9                        |
| 9.  | Pods equally constricted along both margins .....                                                                                          | <b>D. tortuosum</b>      |
| 9.  | Pods more deeply constricted along lower margin .....                                                                                      | 10                       |
| 10. | Inflorescence crowded; vestiture of vegetative parts of straight white hairs;<br>upper margin of pod entire .....                          | <b>D. heterocarpon</b>   |
| 10. | Inflorescence interrupted; vestiture of vegetative parts predominantly<br>of short hooked hairs; upper margin of pod shallowly lobed ..... | <b>D. brachypodum</b>    |
| 11. | Leaves all 1-foliolate .....                                                                                                               | <b>D. 'Melville Is.'</b> |
| 11. | Leaves mostly 3-foliolate .....                                                                                                            | 12                       |
| 12. | Pods equally constricted along both margins .....                                                                                          | 13                       |
| 12. | Pods more deeply constricted along lower margin .....                                                                                      | 14                       |
| 13. | Stipules with a semicircular green auricle at base; articles narrowly<br>elliptic, to 1.5 mm wide .....                                    | <b>D. scorpiurus</b>     |
| 13. | Stipules not as above; articles not as above, ≥2 mm wide .....                                                                             | <b>D. tortuosum</b>      |
| 14. | Articles of pod inflated .....                                                                                                             | <b>D. campylocaulon</b>  |
| 14. | Articles of pod flattened .....                                                                                                            | 15                       |
| 15. | All articles of pod glabrous or sometimes with a few short hooked hairs .....                                                              | <b>D. trichostachyum</b> |
| 15. | Pods with various types of hairs (basal articles sometimes glabrous) .....                                                                 | 16                       |
| 16. | Pods with clavate hairs only .....                                                                                                         | <b>D. 'Darwin'</b>       |
| 16. | Pods with an indumentum of other hair types .....                                                                                          | 17                       |
| 17. | Leaflets linear, <5 mm wide .....                                                                                                          | <b>D. brownii</b>        |
| 17. | Leaflets not as above .....                                                                                                                | 18                       |

- |     |                                                                                                          |                        |
|-----|----------------------------------------------------------------------------------------------------------|------------------------|
| 18. | Stipules strongly cordate at base; pedicels $\leq 2$ mm long .....                                       | <b>D. brachypodum</b>  |
| 18. | Stipules not as above; pedicels $> 2$ mm long .....                                                      | <b>19</b>              |
| 19. | Pod with short hooked hairs, rarely with septate glandular hairs .....                                   | <b>20</b>              |
| 19. | Pod fringed with either fine, or stout and scale-like simple hairs .....                                 | <b>21</b>              |
| 20. | Articles $> 3.5$ mm long, 3-5 mm wide; on cracking clay soils .....                                      | <b>D. muelleri</b>     |
| 20. | Articles $< 3.5$ mm long, usually 2-3 mm wide; on other soils .....                                      | <b>D. 'Pine Ck'</b>    |
| 21. | Margin of pod with fine short pointed hairs, face with fine hooked hairs .....                           | <b>D. 'Limbunya'</b>   |
| 21. | Margin of pod with white blunt scale-like hairs, face with white simple<br>and minute hooked hairs ..... | <b>D. filiforme</b>    |
| 22. | Leaflets to 12 mm long; leaf rachis to 12 mm long .....                                                  | <b>D. triflorum</b>    |
| 22. | Leaflets $> 12$ mm long; leaf rachis $> 12$ mm long .....                                                | <b>Dendrobium q.v.</b> |

### **D. biarticulatum (L.) F.Muell.**

*Dicerma biarticulatum* (L.) DC.

An erect multistemmed annual *shrub* to 1.5 m tall. Indumentum sparse to dense on leaves and stems, of adpressed, long, stout, white, glandular based hairs interspersed with erect minute hooked hairs. *Stipules* perfoliate, free part of leaf rachis arising from the sinus of the open side, brown, 10-20 mm long, scarious, 3-4 lobed, lobes long acuminate. *Leaves* pinnately (apparently digitately) 3-foliolate; rachis 5-15 mm long; *leaflets* narrowly elliptic, linear, narrowly oblanceolate or narrowly lanceolate, 13-60 mm long, 3-10 mm wide, L/W 3.9-10, base cuneate, apex acute or apiculate. *Inflorescence* linear, compact, to 170 mm long; flowers obscured by bracts and bracteoles, the latter subtending calyx, both persistent, similar, olivaceous to brown, subulate, bracts 8-12 mm long, bracteoles 5-7 mm long, ciliate. Pedicels flattened, 1-2.5 mm long. *Calyx* 3-4 mm long, with minute hooked hairs; lobes 4, subequal,  $\pm$  equal to tube, upper lobe minutely bifid. *Corolla* pale pink-mauve to white; standard erect, shortly clawed, 6-8 mm long; wings and keel long-clawed. Upper stamen adhering to one side of the sheath in the lower half. *Ovary* densely hirsute; style thickened below the stigma. *Pod* brown, oblong, flattened, moniliform, 7-10 mm long, 3-4 mm wide, indumentum dense, hairs adpressed white; *articles* 1-2, 4-5 mm long, venation radial. *Seeds* pale yellow-green, oblong, lenticular, 1.7-2.5 mm long, 1.3-1.9 mm wide. *Flowering*: Jan - July; fruiting: Feb - July. Fig. 21

Occurs through the Old World tropics from India to tropical Australia. Typically grows on deep sandy soils on drainage flats. A second form of this species also occurs in the DR. It is smaller in all parts, particularly the leaves and is sometimes prostrate. Two varieties have been recognised. Both the typical variety and var. *australiense* (Schind.) Meeuwen have been recorded for the NT but from the literature it is difficult to equate them with the 2 local forms.

### **D. brachypodum A.Gray**

An erect perennial *shrub* (?with annual aerial parts) to 1 m tall. Vegetative parts and calyx densely covered with short hooked hairs, occasional straight and septate glandular based hairs also present. Foliage and stipules in dried specimens often blue-green. *Stipules* spreading, 5-7 mm long, coriaceous, cordate, acuminate. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 15-45 mm, 27-77 mm overall; stipels setaceous, c. 3 mm long; *leaflets* ovate, elliptic, or orbicular, base rounded, truncate or cordate, apex rounded or emarginate; basal leaflets 25-67 mm long, 13-43 mm wide, L/W 1.3-1.9; terminal leaflet 32-78 mm long, 28-62 mm wide, L/W 1.0-1.6. *Inflorescence* interrupted, to 300 mm long; bracts persistent, 3-4 mm long. Pedicels 1.5-2 mm long; bracteoles absent. *Calyx* c. 2 mm long, minutely papillose; lobes 4,  $\pm$  equal to tube, upper lobe bifid. *Corolla* pink-purple, standard not clawed, obovate, 3.5-5 mm long, 4.5 mm wide, emarginate; wings and keel shortly clawed, shallowly lobed. *Pod* brown, to 30 mm long, 2.8-3.5 mm wide, densely covered with hooked hairs and also septate glandular based hairs, upper margin shallowly lobed, lower deeply lobed; *articles* 6-7, c. 5 mm long. *Seeds* red-brown, oblong-reniform, 3-3.2 mm long, 1.7-2 mm wide. *Flowering*: Mar - June; fruiting: Dec, Feb and June. Fig. 21

Occurs in New Guinea, eastern Australia as far south as Victoria and in the NT. Not in the DR but occurring in the VRD and around the southern Gulf of Carpentaria. Found on dry sites in *Acacia shirleyi* thickets or Eucalypt savanna.

### **D. brownii Schindler**

An erect annual *herb* to 60 cm tall. Vegetative parts with patent white or yellow strigose hairs (adpressed on leaves) and short hooked hairs. *Stipules* brown, 3-6 mm long, attenuate. *Leaves* pinnately 3-foliolate or 1-foliolate; rachis to basal leaflets 1-12 mm, 2-17 mm



overall; *leaflets* linear, 6.5-60 mm long, 1.5-4 mm wide, L/W 3-15, base rounded, apex acute. *Inflorescence* sparse, to 150 mm long, rachis and pedicel with glandular based secretory hairs and hooked hairs; flowers solitary at bracts; bracts caducous, ovate, c. 2 mm long. Pedicels filiform, 8-12 mm long; bracteoles absent. *Calyx* c. 1.5 mm long, with antrorse white long strigose hairs, minute hooked hairs and  $\pm$  glandular based secretory hairs; lobes 5, 1-2 times as long as tube, upper lobes shortly connate. *Corolla* pink or white; standard scarcely clawed, orbicular, 2.7-3 mm long, with minute calli; wings and keel clawed. Ovary glabrous. *Pod* yellow-brown, straight or slightly curved, 7-13 mm long, 2.3-3 mm wide, upper margin shallowly lobed, lower margin more deeply lobed to form a narrow neck c. 0.5 mm wide; *articles* 1-4, 2.8-4 mm long, margin fringed with white hooked hairs, faces glabrous or with minute hooked hairs, or with long and short hooked hairs, venation prominent. *Seeds* dark brown, reniform, 1.8-2 mm long, 1.1-1.5 mm wide. *Flowering* and fruiting: Feb - Apr. Fig. 21

Endemic to and widespread in tropical Australia. Relatively common in the DR. Grows on well drained, sandy soils in open vegetation.

#### **D. campylocaulon** F.Muell. ex Benth.

*Alysicarpus campylocaulis* (Benth.) Schindler

A prostrate or decumbent stoloniferous *herb* to 20 cm tall, with perennial rootstock and annual stems. Vegetative parts densely covered with short hooked hairs; the lightly scabrid leaves also with occasional simple hairs. *Stipules* 5-7 mm long, cordate, acuminate. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 25-95 mm, 30-110 mm overall; stipels 3-5 mm long; *leaflets* dorsiventral, lanceolate or narrowly elliptic, 22-101 mm long, 6.5-18 mm wide, L/W 3.1-6, venation prominently raised below, base rounded, apex acute. *Inflorescence* to 150 mm long; bracts persistent, 3-3.5 mm long. Pedicels 3-4 mm long; bracteoles absent. *Calyx* 2-3.5 mm long, with hooked and simple hairs; lobes 4, 1-2 times as long as tube, upper lobe bifid. *Corolla* purple, minutely papillose; standard shortly clawed,  $\pm$  orbicular, 3.5-6 mm long; wings clawed; keel long-clawed; style short. *Pod* stramineous, 18-32 mm long, 3-4 mm wide, with hooked and occasional simple hairs, resinous, upper margin almost entire, lower deeply lobed almost to the upper suture, the articles separated by a narrow neck; *articles* 3-8, 3.8-5 mm long, inflated. *Seeds* red-brown, oblong, c. 3 mm long, 1.9-2 mm wide. *Flowering* and fruiting: variable, depending on rainfall. Fig. 21

Endemic to Australia and found in Qld, NSW and

the NT. Not in the DR, but elsewhere in the NT occurring on black cracking clay soils with Mitchell Grass (*Astrebla* spp.).

#### **D. filiforme** Moritzi ex Zoll.

A prostrate annual (rarely perennial) *herb*. Stems with patent white long and short simple hairs and short hooked hairs; leaves with sparse adpressed white simple hairs. *Stipules* brown, 3.5-5 mm long, attenuate. *Leaves* pinnately 3-foliolate or 1-foliolate; rachis to basal leaflets 2-13 mm, 2-20 mm overall; *leaflets* oblong, oblong-elliptic or oblong-linear, occasionally obovate or narrowly ovate, 8-38 mm long, 2-17 mm wide, L/W 1.4-5, base rounded or cordate, apex emarginate. *Inflorescence* sparse, to 150 mm long, with adpressed white to yellowish strigose hairs on the rachis; flowers solitary at bracts; bracts mostly early caducous, 3.5-5 mm long, with minute hooked hairs and fringed with white strigose hairs. Pedicels 7.5-8 mm long, with minute hooked hairs, rarely with occasional septate glandular hairs; bracteoles absent. *Calyx* 2-3 mm long, with minute hooked and antrorse white strigose hairs; lobes 5, 4-5 times as long as tube, upper lobes shortly connate above the tube. *Corolla* purple, pale pink or mauve; standard shortly clawed, obovate, 3-3.5 mm long, with minute calli; wings and keel shortly clawed. Ovary sparsely hairy. *Pod* pale brown, straight or slightly curved, 8-17 mm long, 3-4 mm wide, margin glabrous to densely hairy with white straight thickened scale-like simple hairs, faces with white simple and minute hooked hairs, hairs less frequent or absent on lower articles, upper margin c. 1/10 divided, lower margin c. 1/3 divided; *articles* 1-6, 3.5-5 mm long, venation often red, prominent. *Seeds* pale brown,  $\pm$  reniform, 2.1-2.8 mm long, 1.8-2.1 mm wide. *Flowering*: Mar - June; fruiting: Mar - Aug. Fig. 21

Found in Java, eastern Indonesia, New Guinea and northern Australia. Not in the DR, but south of Katherine usually occurring on sandy soils on stream margins and floodouts.

#### **D. gangeticum** (L.) DC.

An erect *shrub* to 1.5 m tall, annual or with perennial rootstock and annual aerial parts. Vegetative parts pilose to glabrescent with simple long straight and/or short hooked secretory hairs. *Stipules* subulate, 5.5-10 mm long. *Leaves* 1-foliolate; rachis 9-44 mm long; stipels subulate, striate; *leaflets* thin, dorsiventral, ovate, elliptic, broadly elliptic or suborbicular, 19-120 mm long, 18-60 mm wide, L/W 1.1-2.8, base rounded or cordate, apex acute or obtuse. *Inflorescence* to 500 mm long; bracts caducous,

subulate, 2-5 mm long. Pedicels 2-5 mm long; bracteoles absent. *Calyx* 2-2.5 mm long; lobes 4, subequal,  $\pm$  equal to tube, upper lobe broader and bifid. *Corolla* pink-purple, standard not clawed, obovate, 4.5-5 mm long; wings clawed, lobed at base; keel clawed, lower margin connate. Style strongly curved. *Pod* brown, oblong, flattened, 17-25 mm long, 2-2.5 mm wide, both margins constricted, the lower more deeply; *articles* 5-8, 2.8-3 mm long. *Seeds* brown, reniform, c. 1.6 mm long, 1.2 mm wide. *Flowering*: Jan - Mar; fruiting: Jan - June, rarely later. Fig. 21

Occurs throughout the Old World tropics including tropical Australia and extends to northern NSW. In the DR, it grows in riparian habitats and monsoon forest margins on a variety of soils.

**D. heterocarpon (L.) DC. var. strigosum** Meeuwen

An erect short-lived perennial *shrub* to 1.5 m tall, resprouting from the rootstock after fire. Vegetative parts with strigose adpressed white to yellowish hairs. *Stipules* subulate, 7-14 mm long. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 8-25 mm, 11-38 mm overall; stipels subulate, apex filiform; *leaflets* elliptic, obovate, or oblanceolate, 10-52 mm long, 8-30 mm wide, L/W 1.3-2.4, terminal leaflet 26-70 mm long, 15-38 mm wide, L/W 1.2-2.3, base rounded, apex rounded or emarginate; basal leaflets c. 2/3 as long as terminal. *Inflorescence* crowded, to 160 mm long; bracts caducous, subulate, 4-5 mm long, margin ciliate. Pedicels 3-5 mm long; bracteoles absent. *Calyx* 1.8-2 mm long, with minute septate glandular hairs and scattered simple hairs; lobes 4, subequal, as long as tube, upper lobe broader and minutely bifid. *Corolla* pink-purple, standard not clawed, obovate, 6-8 mm long, emarginate; wings clawed, weakly adherent to keel; keel clawed. *Ovary* papillose and with scattered simple hairs, when developing also with minute septate glandular hairs. *Pod* brown, persistent, shortly stipitate, oblong, flattened, 11-17 mm long, 2.5-3 mm wide, margins fringed with yellowish hooked hairs or with scattered hairs throughout, dehiscing along lower sutures and between the articles, upper margin entire, lower shallowly lobed; *articles* 3-8, 2.5-3.5 mm long, venation transverse. *Seeds* pale brown or pale yellow,  $\pm$  reniform, 1.5-2 mm long, c. 1.5 mm wide. *Flowering*: Jan - Mar; fruiting: Feb - June, old fruits persisting longer. Fig. 21

Occurs through the Old World tropics to New Caledonia and tropical Australia. Relatively uncommon in the DR. Typically on perennially moist sites in riparian habitats.

**D. muelleri** Benth.

An erect or spreading annual *herb* to 40 cm tall. Indumentum variable: stems with sparse patent to adpressed long white strigose hairs, short hooked hairs and occasional glandular based secretory hairs; leaves with adpressed long white strigose hairs, glabrous above. *Stipules* brown, 3-5 mm long, attenuate. *Leaves* pinnately 3-foliolate and 1-foliolate; rachis to basal leaflets 3-17 mm, 3-30 mm overall; *leaflets* lanceolate, narrowly elliptic, narrowly lanceolate or narrowly oblong-elliptic, 11-58 mm long, 3-13 mm wide, L/W 2.7-7.5, base rounded, apex acute to emarginate. *Inflorescence* sparse, to 200 mm long, rachis with sparse patent to adpressed long white strigose hairs, short and minute hooked hairs, and occasional glandular based secretory hairs; flowers solitary at bracts; bracts caducous, c. 3 mm long. Pedicels 5-15 mm long, with glandular based secretory hairs and short hooked hairs; bracteoles absent. *Calyx* 2-3 mm long, with minute hooked and long white simple hairs, sometimes with glandular based secretory hairs; lobes 5, 0.5-3 times as long as tube, upper lobes shortly connate. *Corolla* pink-mauve; standard 3.5-4 mm long; wings and keel shortly clawed; style reflexed. *Pod* yellow-brown, straight to falcate, 11-27 mm long, 3-4 mm wide,  $\pm$  densely covered with hooked hairs, those of the faces long and tubercular based, septate glandular hairs sometimes present, upper margin entire, lower margin shallowly lobed; *articles* 2-6, 4-5.5 mm long, dehiscing along the lower margin, venation transverse. *Seeds* mottled black and olivaceous, or brown or olivaceous, reniform, 2.5-3 mm long, 1.5-2.2 mm wide, hilum eccentric, annulus obscure. *Flowering*: Feb - July; fruiting: Mar - July. Fig. 21

Widespread in tropical Australia, invariably on cracking clay soils. Relatively common in the Barkly Region, but rare in the DR where it is known only from the Adelaide River floodplain. Another form has leaflets which are broadly elliptic to oblong-elliptic, 9-37 mm long, 6-22 mm wide and L/W 1.1-1.8.

**D. polyneurum** S.T.Blake

An erect multistemmed *shrub* to 1 m tall, with perennial rootstock and annual aerial parts. All parts (except corolla) closely tomentose with  $\pm$  crisped simple hairs giving the plant a silvery sheen. *Stipules* caducous, connate along one side to half their length, 5-7 mm long, leaving a prominent scar. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 6-16 mm, 13-28 mm overall; stipels c. 2 mm long; *leaflets* dorsiventral, obovate, oblanceolate, elliptic, or broadly elliptic, base rounded, apex rounded, acute or obtuse; basal leaflets c. 2/3 as long as terminal,



24-72 mm long, 14-38 mm wide, L/W 1.9-2.6; terminal leaflet 32-90 mm long, 16-39 mm wide, L/W 1.7-2.6. *Inflorescence* 30-90 mm long, 6-9 flowered; bracts and bracteoles similar. Pedicels 3-8 mm long; bracteoles subtending calyx, caducous, ovate, c. 2 mm long. *Calyx* 6-8 mm long; lobes 4, reflexed at flowering, unequal, as long as tube, upper lobe broader and minutely bifid, lower lobe longer, straight. *Corolla* yellow to white; standard clawed, orbicular, 9-12 mm long, emarginate with slightly thickened calli; wings clawed, shortly lobed, lamellate; keel clawed, shortly lobed, lower margin adhering in central 1/3 to 2/3. Upper *stamen* connate to lower half of sheath to form a tube, free above; anthers dorsifixed. *Ovary* densely tomentose; style tomentose in lower half. *Pod* silvery, stiffly coriaceous, 20-40 mm long, 3.5-5 mm wide, both margins evenly and shallowly constricted; *articles* 2-5, 8-9 mm long, thick walled, ?indehiscent, venation obscure. *Seeds* not seen mature, c. 3 mm long. *Flowering*: June - Nov; *fruiting*: Dec, Jan, May. Fig. 21

Endemic to the Daly River region of the western Top End. In the DR, known only from near Ooloo.

**D. pulchellum** (L.) Benth.

*Phyllodium pulchellum* (L.) Desv.

An erect annual or short-lived perennial *shrub* to 2 m tall. All parts (except corolla)  $\pm$  pilose with long simple and/or short hooked secretory hairs. *Stipules* occasionally connate along one margin, 7-14 mm long, subulate. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 9-23 mm, 17-54 mm overall; stipels 2-4 mm long, subulate; *leaflets* ovate or elliptic, base rounded to subcordate, margins  $\pm$  undulate, apex acute or rounded; basal leaflets 35-70 mm long, 18-55 mm wide, L/W 1.2-1.9; terminal leaflet 60-137 mm long, 30-83 mm wide, L/W 1.3-2.1. *Inflorescence* racemose or paniculate, to 300 mm long, usually less; each cluster of flowers subtended by a small leaf of 2 leaflets and a terminal bristle, the rachis twisted through 180°, leaflets  $\pm$  orbicular, 10-20 mm long, held erect and enveloping the cluster or in some plants the inflorescence leaves absent or poorly developed; bracts persistent, 2-2.5 mm long, subulate. Pedicels filiform, 2-4 mm long; bracteoles subtending calyx, 1-1.5 mm long. *Calyx* 2.5-3 mm long; lobes 4, 1/2 as long as tube, upper lobe  $\pm$  bifid. *Corolla* pale yellow; standard not clawed, obovate-elliptic, c. 6 mm long, emarginate; wings long clawed, shortly lobed, lamellate; keel long clawed, lower margins adhering in upper 1/3 to 2/3. Upper *stamen* adhering to lower 1/3 of sheath to form a tube, free above; anthers dorsifixed. *Ovary* densely hairy; style strongly curved, hairy in lower 1/2. *Pod* brown, 7-16 mm long, 3.5-4

mm wide, with simple hairs, margins equally constricted; *articles* 1-3, 5-6 mm long. *Seeds* pale to dark brown,  $\pm$  reniform, flattened, 3-3.5 mm long, 2-2.8 mm wide. *Flowering*: Feb; *fruiting*: Apr - July. Fig. 22

Occurs in Asia from India to Taiwan and to northern Australia (Cape York and Top End). Occurrences in DR scattered. Usually growing in perennially moist areas at the edge of monsoon forest or in riparian habitats, on various soils.

**\*D. scorpiurus** (Sw.) Desv. ex DC.

A prostrate *herb*, apparently perennial. Stems with short and long hooked hairs, septate glandular hairs and occasional long strigose hairs. *Stipules* ovate, 2.5-4.5 mm long, with a semicircular green auricle on one side, apex attenuate. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 15-25 mm, 19-31 mm overall; stipels c. 2.5 mm long; *leaflets* elliptic, obovate or lanceolate, 15-35 mm long, 8-18 mm wide, L/W 1.8-2.2, with long strigose hairs, shorter fine simple hairs and long hooked hairs, base cuneate, apex obtuse to acute, finely emarginate. *Inflorescence* sparse, to 140 mm long, rachis with short hooked hairs, fine straight simple hairs and occasional septate glandular hairs; flowers 1-3 at bracts; bracts persistent, green, c. 3 mm long, attenuate. Pedicels 3-7 mm long, with septate glandular hairs and short hooked hairs; bracteoles absent. *Calyx* c. 2.5 mm long, with minute hooked and long simple strigose hairs and occasional septate glandular hairs; lobes 5, 1.5 times as long as tube. *Corolla* pink-mauve; standard 3.5-4 mm long. *Pod* pale brown, curved, 25-32 mm long, 1-1.5 mm wide,  $\pm$  densely covered with long hooked hairs and occasional septate glandular hairs, upper and lower margins equally lobed, constrictions between the articles  $\pm$  thickened; *articles* c. 6, narrowly elliptic, 4-6 mm long, apparently indehiscent, venation longitudinal. *Seeds* yellow-brown, cylindrical, 2-2.75 mm long, 1.25-1.6 mm wide. *Flowering*: May - June; *fruiting*: Oct. Fig. 22

A widespread tropical weed native to central America. In Australia, found in north Qld and rarely in the DR where it occurs as a weed of lawns in parts of Darwin.

**\*D. tortuosum** (Sw.) DC.

An erect annual *shrub* to 1.2 m tall. Indumentum of strigose simple septate glandular based and small hooked hairs throughout, the inflorescence branches densely hairy and viscid, leaves slightly scabrid. *Stipules* 8-12 mm long, cordate, acuminate. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 8-45 mm,

## Desmodium

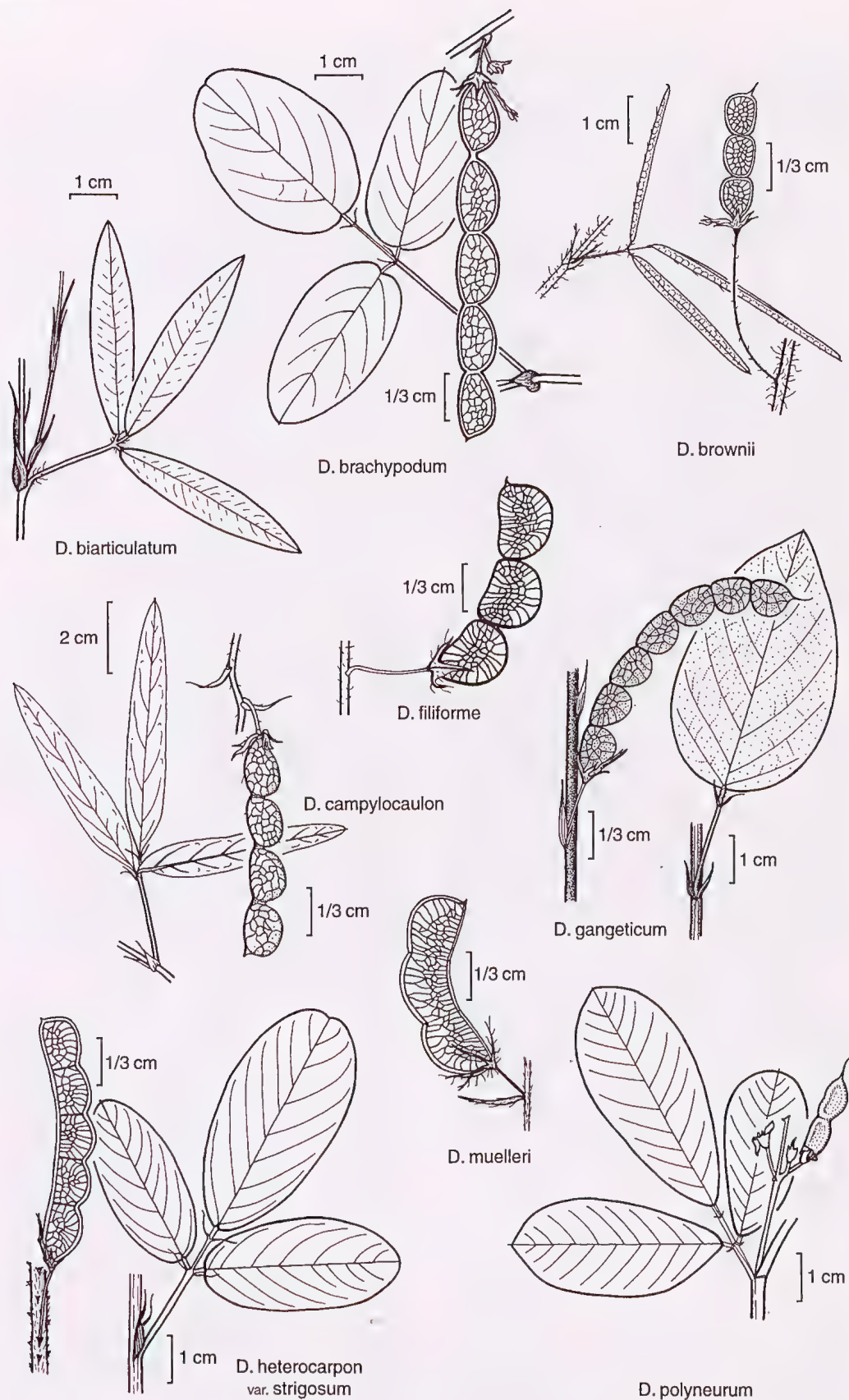


**Fig. 21**



12-72 mm overall; stipels 6-7 mm long; *leaflets* narrowly elliptic, lanceolate or rhomboidal, base cuneate, apex acute to obtuse; basal leaflets c. 2/3 length of terminal, 13-54 mm long, 7-23 mm wide, L/W 1.4-2.5; terminal leaflet 22-110 mm long, 13-42 mm wide, L/W 1.7-2.9. *Inflorescence* racemose or paniculate, interrupted, to 300 mm long; bracts caducous, subulate, 7-9 mm long. Pedicels 11-17 mm long; bracteoles absent. *Calyx* 2-3 mm long; lobes 4, 2-3 times as long as tube, upper lobe bifid. *Corolla* pale mauve, minutely papillose; standard shortly clawed, obovate-orbicular, 3-5 mm long; wings shortly clawed, shallowly lobed; keel clawed. Upper *stamen* adhering shortly to base of sheath, free above. *Style* short. *Pod* yellow-green to brown, 15-23 mm long, 3-4 mm wide, densely covered with hooked hairs, also septate glandular hairs, sticky, both margins equally constricted; *articles* 3-6, disarticulating readily, elliptic, flattened, undulate, 3.5-5 mm long. *Seeds* pale brown, elliptic, flattened, 1.8-2.8 mm long, 1.3-2 mm wide. *Flowering* and fruiting: most months. Fig. 22

Native to tropical America but now pantropical in distribution. Widespread in tropical Australia. A weed of disturbed places.

#### **D. trichostachyum** Benth.

A prostrate annual *herb*, often forming dense mats. Vegetative parts with patent or adpressed white simple hairs, leaves often glabrous. *Stipules* brown, 3.5-6 mm long, attenuate. *Leaves* pinnately 3-foliolate or 1-foliolate; rachis to basal leaflets 2-18 mm, 2-24 mm overall; *leaflets* obcordate to reniform, 3.5-16 mm long, 3-18 mm wide, L/W 0.7-1.1, base rounded or cordate, apex emarginate. *Inflorescence* sparse, to 200 mm long, with white simple hairs on the rachis; flowers solitary at bracts; bracts caducous, c. 1.5 mm long. Pedicels filiform, 3-10 mm long, with minute hooked hairs; bracteoles absent. *Calyx* 1-1.8 mm long, with minute hooked and long simple hairs; lobes 5, 3-5 times as long as tube, upper pair shortly connate. *Corolla* purple; standard not clawed, orbicular, c. 1.5 mm long,  $\pm$  emarginate; wings and keel shortly clawed. *Pod* yellow-brown, straight or slightly curved, 10-12 mm long, 2-2.5 mm wide, glabrous or occasionally with minute hooked hairs, upper margin entire, lower margin lobed 1/3-1/2 width of pod; *articles* 1-5, 2.5-3 mm long. *Seeds* mottled black and olivaceous, or dark brown or olivaceous, shape variable, 1.2-2 mm long, 1.2-1.5 mm wide. *Flowering* and fruiting: Feb - June. Fig. 22

Endemic to and widespread in northern Australia. Relatively common in the DR. On low, seasonally wet areas, often on sandy soils or adjacent to floodplains.

#### **\*D. triflorum** (L.) DC.

Prostrate annual *herb*. Vegetative parts sparsely hairy with white simple and minute hooked hairs. *Stipules* brown, adnate to lower part of leaf rachis, c. 3.5 mm long. *Leaves* pinnately 3-foliolate, rachis to basal leaflets 4-10 mm, 6-12 mm overall; *leaflets* obcordate or orbicular, 2-12 mm long, 2-11 mm wide, L/W 0.9-1.3, usually emarginate. *Flowers* in axillary fascicles of 3 or 4. Pedicels 3-8.5 mm long. Bracts persistent; bracteoles absent. *Calyx* c. 3 mm long. *Corolla* purple to almost white; standard c. 4 mm long. Ovules c. 4. *Pod* brown, 7-17 mm long, c. 2.5 mm wide, with long hooked hairs; *articles* 2-4, indehiscent, c. 2.5 mm long, c. 2.5 mm wide. *Seeds* olivaceous, reniform, c. 2.2 mm long, c. 1.5 mm wide. *Flowering* and fruiting: late Wet and early Dry season. Fig. 22

Pantropical; in Australia in the NT and Qld. A frequent weed in lawns.

#### **D. velutinum** (Willd.) DC.

An erect annual *shrub* to 1.5 m tall. All parts (except corolla and pod) densely hairy with simple white patent hairs. *Stipules* 3-7 mm long, cordate, acuminate. *Leaves* 1-foliolate; rachis 8-34 mm long; stipels c. 4 mm long; *leaflets* dorsiventral, ovate to elliptic, 42-135 mm long, 30-100 mm wide, L/W 1.3-1.4, venation prominent below, base cordate, apex obtuse or rounded,  $\pm$  apiculate. *Inflorescence* crowded, to 230 mm long; bracts persistent, setaceous, c. 3 mm long. Pedicels 2-3 mm long; bracteoles absent. *Calyx* 4-5 mm long; lobes 4, subequal, c. 2 times as long as tube, upper lobe  $\pm$  bifid, lower lobe longer and narrower. *Corolla* pink-purple; standard not clawed, obovate, 6 mm long; wings and keel clawed. *Pod* brown, 16-18 mm long, 2.5-3 mm wide, densely hispid with simple and hooked hairs, upper margin entire, lower margin shallowly lobed; *articles* 4-5, disarticulating readily, c. 3 mm long, venation obscure. *Seeds* pale yellow, oblong-reniform, 1.8-2.7 mm long, 1.3-2 mm wide. *Flowering*: Mar; fruiting: Apr - June. Fig. 22

Widespread, occurring in Africa, Madagascar, Malesia and in Australia, where it is known only from the Alligator Rivers Region and Mary River area. Grows in dry monsoon forest on well drained soils.

#### **D. 'Darwin'**

A prostrate annual *herb*. Stems with dense patent yellowish strigose simple hairs; leaves with sparse adpressed white simple hairs. *Stipules* brown, 5-7 mm long, attenuate. *Leaves* pinnately 3-foliolate or 1-

foliolate; rachis to basal leaflets 3-15 mm, 3-20 mm overall; *leaflets* obcordate, orbicular or reniform, rarely oblong, 5-30 mm long, 5-22 mm wide, L/W 0.9-1.3(2), base rounded or cordate, apex emarginate or truncate. *Inflorescence* sparse, to 450 mm long, with dense patent (occasionally adpressed) yellowish strigose hairs on the rachis, flowers 1 per bract; bracts caducous, 3-4 mm long, with white or yellow strigose simple hairs. Pedicels 6-9 mm long, with short hooked hairs, glandular based hairs and yellowish long strigose hairs; bracteoles absent. *Calyx* 2-3 mm long, with minute and short hooked hairs and yellow strigose hairs; lobes 5, 3-4 times as long as tube, upper lobes shortly connate. *Corolla* pink or white; standard shortly clawed, obovate, 2-4 mm long, with 2 small calli; wings clawed, adhering to keel; keel clawed. *Pod* brown, straight or slightly curved, 6-15 mm long, 2-3.5 mm wide, with white (rarely yellow) clavate hairs, less frequent or absent on lower articles, upper margin c. 1/10 divided, lower margin c. 1/3 divided; *articles* 1-5, 2-3 mm long. *Seeds* yellow-brown or dark brown,  $\pm$  reniform, 1.5-1.9 mm long, 1-1.6 mm wide. *Flowering* and fruiting: Feb - June. Fig. 22

Apparently endemic to the Top End of the NT and common in the DR. Colonising and forming mats on disturbed, seasonally wet areas.

#### D. 'Limbunya'

A prostrate or spreading annual *herb*. Stems and leaves with patent to adpressed long white hairs and minute hooked hairs, leaves often glabrous above. *Stipules* brown, 3-5 mm long, attenuate. *Leaves* pinnately 3-foliate or 1-foliate; rachis to basal leaflets 4-10 mm, 5-15 mm overall; *leaflets* obovate-elliptic, broadly elliptic, suborbicular or obcordate, 8-31 mm long, 6-23 mm wide, L/W 1-1.4, base rounded, apex emarginate, rounded or truncate. *Inflorescence* few flowered, bracteate, to 120 mm long, rachis with adpressed long white strigose hairs; flowers solitary in upper bracts; bracts  $\pm$  persistent, 3-4.5 mm long. Pedicels 2-8 mm long, with minute hooked hairs and occasional patent long white hairs or almost glabrous; bracteoles absent. *Calyx* c. 3 mm long, with minute hooked and long white simple hairs; lobes 5, 0.5-3 times as long as tube, upper lobes shortly connate. *Corolla* pink-mauve; standard distinctly clawed, obovate, c. 3.5 mm long, with 2 calli at base; wings and keel shortly clawed. *Pod* yellow-brown, falcate, 8-17 mm long, 3-4 mm wide, fringed with fine short simple hairs, faces with short hooked hairs, upper margin entire, lobes of lower margin c. 1/6 width of pod; *articles* 1-5, 4 mm long, dehiscing along the lower margin, venation transverse.

*Seeds* pale brown or olivaceous often with black or purple spots, reniform, 2.8-3 mm long, 1.8-2.2 mm wide, hilum eccentric, annulus obscure. *Flowering*: Feb - May; fruiting: Mar - June. Fig. 22

Known from the Katherine area to the West Kimberley Region. Not in the DR. Occurs in open habitats on a variety of soils including clays and red sandy soils. Some specimens from the Keep River area have features intermediate between this species and *D. filiforme*.

#### D. 'Melville Is.'

A straggling *creeper* with annual stems to 0.5 m long, and perennial rootstock. Stems, undersides of leaves and margins of stipules with adpressed or patent simple white hairs and/or short hooked secretory hairs, stems also with colleters. *Inflorescence* branches, calyx and fruit with septate glandular based and hooked secretory hairs, the calyx also with simple straight hairs. *Stipules* red-brown, 6-19 mm long, subulate. *Leaves* 1-foliate; rachis 11-18 mm long; stipels 2.5-6 mm long, subulate; *leaflets* ovate to orbicular, 16-54 mm long, 18-42 mm wide, L/W 0.9-1.3, venation prominent below, tertiary venation scalariform, base rounded or cordate, apex rounded. *Inflorescence* to 100 mm long; bracts  $\pm$  persistent, ovate, acuminate, 5-7 mm long. Pedicels 4-5 mm long; bracteoles absent. *Calyx* 2.5-3 mm long; lobes 4, subequal, 1-2 times as long as tube, upper lobe shallowly to deeply bifid. *Corolla* colour unknown; standard not clawed,  $\pm$  orbicular, 2.5-3 mm long, slightly broader than long; wings shortly clawed, basal lobes poorly developed; keel shortly clawed, lobes absent. *Pod* brown, 14-20 mm long, c. 3 mm wide, with hooked hairs, upper margin entire to shallowly lobed, lower margin shallowly to deeply lobed; *articles* 3-6, disarticulating tardily, 4-5 mm long, dehiscing along lower margin, venation transverse. *Seeds* brown, oblong, 1.6-2.8 mm long, 1.3-2 mm wide. *Flowering*: Oct - May; fruiting: Apr - May. Fig. 22

Apparently endemic to the DR where it is known only from Melville Is. and near the upper Adelaide R., in Eucalypt savanna.

#### D. 'Pine Ck'

An erect or spreading annual *herb* to 35 cm tall, often smaller. Stems with patent to adpressed long yellow or white hairs, and occasional short hooked hairs and glandular based secretory hairs; leaves with soft spreading long white hairs. *Stipules* brown, 3.5-4.5 mm long, attenuate. *Leaves* pinnately 3-foliate



or 1-foliolate (especially at base); rachis to basal leaflets 2-16 mm, 2-23 mm overall; *leaflets* oblong, oblong-obovate, oblong-elliptic, linear, oblanceolate, narrowly elliptic, or obcordate, 3-32 mm long, 2-17 mm wide, L/W 0.9-4.4, base rounded, apex rounded to emarginate. *Inflorescence* sparse, to 200 mm long, rachis with sparse patent long yellow or white hairs, and scattered hooked and septate glandular hairs; flowers solitary at bracts; bracts caducous, ovate, c. 3 mm long. Pedicels 5.5-12 mm long, with numerous glandular based secretory hairs and scattered short hooked hairs; bracteoles absent. *Calyx* 1.5-2 mm long, with minute hooked and long yellow or white simple hairs,  $\pm$  occasional glandular based secretory hairs; lobes 5, c. 3 times as long as tube, upper lobes

partly connate. *Corolla* pink-mauve; standard scarcely clawed, obovate, c. 4 mm long; wings and keel shortly clawed. *Pod* pale brown to brown, straight to slightly curved, 8-17 mm long, 2-3(3.5) mm wide, with short hooked hairs, upper margin almost entire, lower margin lobed c. 1/5 width of pod; *articles* 1-5, 2.1-3.5 mm long, dehiscing along the lower margin, venation transverse. *Seeds* black, olivaceous, or dark brown, shiny, reniform, 2-2.2 mm long, 1.5-1.8 mm wide, hilum eccentric, annulus obscure to raised. *Flowering*: Feb - Apr; *fruiting*: Mar - July. Fig. 22

Known from the northern NT and Cape York and common in the DR. Occurs on a variety of soils in open vegetation.

## DUNBARIA Wight & Arn.

Slender twining vines with white simple hairs, scattered septate glandular hairs and vesicular glands throughout, very dense on the undersurface of the leaf and calyx. Stipules persistent, linear. Leaves pinnately 3-foliolate; stipels persistent, minute; leaflets 3-veined at base. *Inflorescence* a reduced axillary raceme. *Calyx* lobes 4, upper lobe bifid. *Corolla* yellow, glabrous; standard clawed, suborbicular, reflexed, auriculate, with a thickened transverse callus, deeply emarginate; wings long clawed, lamellate, deeply lobed at base; keel long clawed, outer margin connate in upper 1/2, inner margin adnate, apex incurved. Stamens 9+1, 9 connate in lower 2/3, upper stamen thickened and geniculate near base; filaments uniform; anthers fixed near base, versatile. Ovary shortly hairy and glandular, ovules 5-8; style inflexed, long, upper half glabrous; stigma capitate. *Pod* brown, oblong, flattened, dehiscent, with spongy septa between the seeds, apex apiculate. *Seeds* transverse, suborbicular, flattened; hilum apical; caruncle pale, conspicuous, almost as long as seed, cleft into 2 parts.

A genus of c. 15 species found through Asia to northern Australia. In Australia there are 2 species, both in the DR.

- |                                                                        |                        |
|------------------------------------------------------------------------|------------------------|
| 1. Terminal leaflet rhomboidal; vesicular glands red .....             | <b>D. rotundifolia</b> |
| 1. Terminal leaflet narrowly lanceolate; vesicular glands golden ..... | <b>D. singuliflora</b> |

### **D. rotundifolia** (Lour.) Merr.

*D. conspersa* Benth.

An annual *vine*. Minutely and thinly pubescent, vesicular glands red. *Stipules* c. 2-4 mm long. *Leaf* rachis to basal leaflets 5-14 mm, 8-23 mm overall; *leaflets* slightly discoloured, rhomboidal, base broadly cuneate, apex acute; terminal leaflet 17-36 mm long, 15-36 mm wide, L/W c. 1; basal leaflets asymmetric, 11-19 mm long, 12-15 mm wide, L/W 1-1.4. *Inflorescence* a reduced or long slender interrupted raceme, 1-or 2-flowered; peduncles 0.5-7 mm long; bracts persistent, c. 2 mm long. Pedicels 2-4 mm long; bracteoles apparently absent. *Calyx* 4-6 mm long; lobes 1-1.6 times as long as tube, upper lobe bifid. *Standard* 8-9 mm long, slightly broader than long. *Pod* slightly curved, 30-42 mm long, 6-7 mm

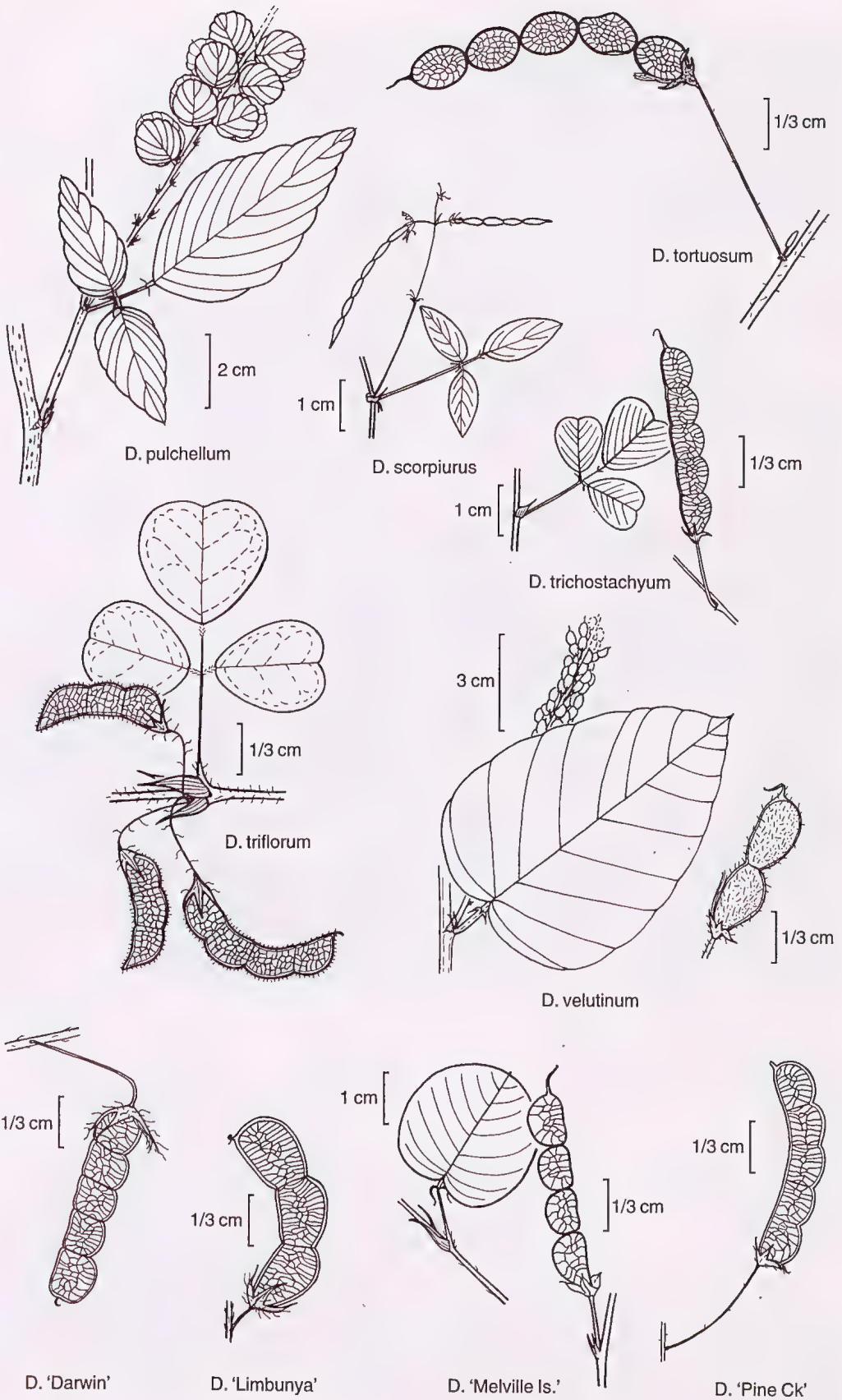
wide. *Seeds* c. 7, dark brown, 2.5-3.5 mm long, 2.5-3.5 mm wide. *Flowering*: Feb - Apr; *fruiting*: Mar - May. Fig. 23

Found from India to northern Australia (north Qld and the Top End), in open habitats on well drained soils. Uncommon in the DR.

### **D. singuliflora** F.Muell.

A *vine* with annual stems and a perennial tuberous rootstock. Minutely and closely tomentose, vesicular glands golden. *Stipules* c. 1 mm long. *Leaf* rachis to basal leaflets 3-11 mm, 5-14 mm overall; *leaflets* strongly discoloured, lanceolate, 7-20 mm long, 2-7.5 mm wide, L/W 1.7-5.5, base rounded, apex obtuse to acute; basal leaflets slightly shorter

# Desmodium





than terminals. *Inflorescence* usually 1-flowered; peduncles 2-9 mm long; bracts caducous c. 1 mm long. Pedicels 5-8 mm long; bracteoles caducous, minute, obscure. *Calyx* 3-6 mm long; lobes subequal, 0.5-1 times as long as tube, upper lobe minutely bifid, lower longer and narrower. Standard c. 9 mm long, 11-12 mm wide. *Pod* straight, 28-50 mm long, 7-9 mm wide. *Seeds* 5-8, green with dark

purple mottles to dark brown, 3.5-5 mm long, 3-3.5 mm wide. *Flowering*: Jan - Mar; fruiting: Feb - May. Fig. 23

Found in tropical Australia and New Guinea, in Eucalypt savanna on well drained soils. Relatively common in the DR. Aboriginal people eat the tuber after it has been cooked on hot coals (Wightman, 1993).

## ERIOSEMA (DC.) G. Don

A genus of c. 130 species occurring throughout the tropics, most commonly in Africa and America. One species occurs in Australia.

### *E. chinense* Vogel

An erect *herb* to 0.8 m tall with annual aerial parts and perennial rootstock consisting of a globular to ellipsoid tuber to 30 mm diam. Stems and leaf undersurfaces densely hairy with adpressed to patent ferruginous, long simple hairs and white short glandular based hairs; the upper surface of the leaf only with sparse long hairs. Yellow resinous deposits present on leaf undersurface, calyx and corolla. *Stipules* persistent, brown, 3-5 mm long, striate, attenuate. *Leaves* 1-foliolate but appear simple; stipels absent; rachis 1-1.5 mm long; *blades* discolorous, narrowly lanceolate to linear, 35-100 mm long, 1-9 mm wide, L/W 9-50, base shallowly cordate, margins inrolled, apex acute. *Inflorescence* axillary, racemose, often with 2 peduncles of differing ages, 2-3-flowered; peduncles to 10 mm long; bracts caducous, 2-4 mm long, similar to stipules. Pedicels c. 1 mm long; bracteoles absent. *Calyx* 3-3.5 mm long; 5-lobed, lobes 0.5-1.3 times as long as tube. *Corolla* yellow; standard shortly clawed, reflexed, obovate to broadly elliptic, auriculate, with a thickened transverse callus,

with hyaline hairs on back, apex emarginate; wings clawed, lamellate, glabrous; keel clawed, hairy and with fused margins towards the apex. *Stamens* 9+1, upper stamen thickened and geniculate near base; filaments uniform; anthers fixed near base, versatile. *Ovary* sessile, densely hairy with adpressed long hairs; ovules 2; *style* inflexed, glabrous; stigma capitate, minute. *Pod* dark brown to almost black, oblong to elliptic, flattened, 8-13 mm long, 6-8 mm wide, early dehiscent, densely covered with ferruginous long fine hairs and short simple hairs. *Seeds* 2, oblique in pod, green with black mottles to dark brown, elliptic, dimidiate, flattened, 3-4 mm long, 2-2.8 mm wide; hilum obscured by caruncle; caruncle prominent, yellow, linear, grooved, thickened at one end. *Flowering*: Nov - Apr; fruiting: Dec - July. Fig. 23

Found through the Old World tropics from India to China and as far south as tropical Australia. Common in the DR, occurring on a wide range of soils in open vegetation. Aboriginal people eat the tuber raw or after it has been cooked on hot coals (Wightman and Smith, 1989).

## ERYTHRINA L.

A genus of c. 108 species, widespread in the tropics and subtropics. Four native species are known from Australia, 2 in the NT. One species is found in the DR.

### *E. vespertilio* Benth.

*E. variegata* L. var. *orientalis* (L.) Merr., misapplied name

A small deciduous *tree* to 8 m, bark pale grey to cream, corky, deeply furrowed. All parts excluding corolla glabrate with occasional patches of stellate hairs, stems and rachis with  $\pm$  scattered prickles.

*Stipules* caducous, stout, c. 1 mm long. *Leaves* pinnately 3-foliolate, rarely simple; rachis to basal leaflets 35-145 mm, 65-220 mm overall; stipels stout, obtuse, glandular, c. 1 mm long; *leaflets* very variable in shape, rhomboidal, broadly elliptic or deltoid, sometimes 2- or 3-lobed, 29-115 mm long, 48-155

mm wide, L/W 0.4-1.1, base attenuate or cuneate, margins entire (juvenile foliage  $\pm$  spinose), apex obtuse, acute or acuminate. *Inflorescences* 1-4 per axil, racemose, to 260 mm long; flowers in upper 2/3, flowering when leafless; bracts caducous, 1.5-2 mm long. Pedicels 5.5-20 mm long; bracteoles caducous, triangular, c. 1.5 mm long. *Calyx* spathaceous, 11-15 mm long; lobes 3-5, subapical, thickened, obscure. *Corolla* bright red, glabrous; standard not clawed, ovate-oblong to obovate, reflexed, 26-34 mm long, lacking auricles, apex obtuse; wings shortly clawed, 1/2 as long as standard, straight, not lobed or lamellate; keel petals shortly clawed, margins free throughout. *Stamens* 9+1, upper stamen connate with other 9 in lower half, c. 35 mm long; filaments alternately long and short; anthers uniform, dorsifixed, versatile. *Ovary* densely hairy with stellate hairs;

ovules 7-11; *style* incurved, glabrous; stigma capitate. *Pod* grey-brown, coriaceous, linear to moniliform,  $\pm$  straight, 55-115 mm long, 9-12 mm wide, dehiscent. *Seeds* 1-4, longitudinal in pod, red, oblong-ellipsoid, 10-11.5 mm long, 4-5.5 mm wide; hilum central; ecarunculate. *Flowering*: May - Oct; fruiting: Sept - Oct. Fig. 23

#### Bat's Wing Coral Tree

Endemic to and widespread in the northern half of Australia. Relatively uncommon in the DR. Grows in open communities on a variety of soils. Aborigines use the seeds to make ornaments and the soft wood to make shields, woomera shafts and coolamons, especially in Central Australia (Wightman *et al.*, 1992; Smith *et al.*, 1993). The charred bark is used as a source of black pigment (P.Huddleston pers. comm.), while the root of young plants is eaten after roasting (Levitt, 1981).

## FLEMINGIA Roxb. ex W.T.Aiton

Perennials with an indumentum of simple hairs and vesicular glands on vegetative and floral parts, with yellow glandular based hairs often present. Stipules present, striate. Leaves digitately 3-foliolate; stipels absent (except in *F. involucrata*); leaflets dorsiventral, the basal pair asymmetric and smaller than the terminal. Inflorescence paniculate or racemose; bracts present; bracteoles absent (except in *F. lineata*). Calyx deeply 5-lobed, the lobes attenuate. Corolla glabrous (except in *F. involucrata*); standard shortly clawed, suborbicular, auriculate; wings and keel petals long-clawed; wings smooth or lamellate; keel usually straight. Stamens 9+1, upper geniculate, thickened or dilated at the knee; anthers uniform, dorsifixed and versatile. Style thickened for most of its length from a thin base, glabrous or hairy only above base; stigma capitate (except *F. involucrata* which has a bearded lateral stigma). Ovary sessile, sericeous, 2-ovuled. Pod inflated, dehiscent, (1)2-seeded. Seeds globose, hilum central, ecarunculate.

An Old World genus of 30-50 species; c. 7 species occur in Australia, from the Kimberley to southern Qld. All 6 NT species are described here though only 5 are known from the DR.

|    |                                                                                  |                        |
|----|----------------------------------------------------------------------------------|------------------------|
| 1. | Flowers in dense heads subtended by bracts.....                                  | <b>F. involucrata</b>  |
| 1. | Flowers in panicles or racemes .....                                             | 2                      |
| 2. | Flowers in open panicles .....                                                   | 3                      |
| 2. | Flowers in racemes .....                                                         | 4                      |
| 3. | Stems prostrate or semi-erect; leaflets 0.9-1.8 times as long as wide .....      | <b>F. trifoliatrum</b> |
| 3. | Stems erect; leaflets 2-5(7.2) times as long as wide .....                       | <b>F. lineata</b>      |
| 4. | Racemes dense, many-flowered; vesicular glands black .....                       | 5                      |
| 4. | Racemes 1-3-flowered; vesicular glands yellow .....                              | <b>F. pauciflora</b>   |
| 5. | Calyx 9-15 mm long; leaf rachis 9-40 mm long; corolla red or purple .....        | <b>F. 'Rum Jungle'</b> |
| 5. | Calyx 5-11 mm long; leaf rachis (25)50-100 mm long; corolla white or green ..... | <b>F. parviflora</b>   |

### **F. involucrata** Wall. ex Benth.

*Maughania* ("Moghania") *involucrata* (Benth.) Kuntze

An erect *herb* or shrub to 1.3 m high, with perennial roots. Softly pilose throughout with patent white long

hairs, yellow glandular hairs and red vesicular glands, the latter more dense on the under side of the leaves and calyx. *Stipules* caducous, brown, lanceolate, 10-18 mm long, 3-6 mm wide, broad based, scar



prominent. *Leaf* rachis 12-45 mm long; stipels  $\pm$  persistent, c. 4 mm long; *leaflets* elliptic or obovate, 40-115 mm long, 15-75 mm wide, L/W 1.7-3.8, base cuneate or rounded, apex acute to obtuse. *Inflorescence* of dense contracted panicles to 60 mm long, heads subtended by broad bracts; bracts persistent, brown, ovate, 10-15 mm long, striate. Pedicels c. 1 mm long. *Calyx* 10-17 mm long; lobes 3-5 times as long as tube, densely hirsute. *Corolla* mauve-pink; standard obovate to suborbicular, 9-12 mm long, with a narrow transverse callus, hairy and with pyriform vesicular glands on back; wings lamellate, with pyriform vesicular glands and occasional simple hairs on back; keel pouched at basal lobes, adhering towards apex on both margins, glabrous. Alternate *staminal* filaments dilated below the anthers. *Style* twisted, incurved; stigma flattened, ciliate. *Pod* dark brown, subglobular, c. 5.5 mm long, c. 3.5 mm wide, thinly tomentose. *Seed* 1, black, depressed globular, c. 4 mm long, 3.5 mm wide, *Flowering*: Feb - July; *fruiting*: Aug. Fig. 23

Widely distributed in the Old World tropics from India to tropical Australia. In Australia from the Kimberley to Qld, but uncommon in the DR. On clayey soils, in depressions in open habitats. Aboriginal people in central Arnhem Land are recorded as having eaten the lateral roots (N.G. White pers. comm.).

#### **F. lineata** (L.) W.T.Aiton

*Maughania* ("Moghania") *lineata* (L.) Kuntze

Erect evergreen *shrub* to 2 m high. Stems tomentose with simple hairs and few vesicular glands. *Stipules* deciduous, free or partly connate, 3-4 mm long. *Leaf* rachis (3)8-40 mm long; *leaflets* oblanceolate, lanceolate, elliptic or narrowly elliptic, 21-157 mm long, 6-60 mm wide, L/W 2-5(7.2), strongly 3-nerved at base, tomentose or glabrate below or glabrate throughout, with vesicular glands below and sometimes throughout, base attenuate, apex acute to rounded. *Inflorescence* of axillary or terminal panicles to 130 mm long, rarely longer; branches densely covered with glandular based and simple hairs, calyx densely glandular hairy and vesicular-glandular; bracts c. 1.5 mm long. Pedicels 1-4 mm long; bracteoles caducous, at base of pedicel. *Calyx* 4-10 mm long, green, lobes 1.5-3.5 times as long as tube. *Corolla* variously coloured, the standard often white, the keel and petals pink or purple, often streaked; standard 6-8 mm long; wings obscurely lamellate. *Pod* pale brown, 10-13 mm long, 5-7 mm wide, thinly tomentose with glandular based and simple hairs and vesicular glands. *Seeds* olivaceous to black, c. 3 mm diam. *Flowering* and *fruiting*: May - Oct. Fig. 23

Widely distributed in the Old World tropics from

India to tropical Australia. Relatively uncommon in the DR. On stream margins, edges of monsoon forests and similar mesic habitats.

#### **F. parviflora** Benth.

*Maughania* ("Moghania") *parviflora* (Benth.) Kuntze;  
*F. schultzei* (F.Muell.) Maconochie; *F. racemosa* Domin

Prostrate or erect rhizomatous *subshrub* with annual stems to c. 0.5 m high. Vegetative parts tomentose and with minute black conical vesicular glands on leaf blades and rachis. *Stipules* caducous, 3-10 mm long. *Leaf* rachis (25)50-100 mm long, ridged or narrowly winged; *leaflets* lanceolate, elliptic or ovate, 32-125 mm long, 15-75 mm wide, L/W 1.6-2.7, bases rounded to cuneate, apices rounded to acute. *Inflorescence* of 1(2) dense axillary racemes to 60 mm long arising from erect leafy stems or from leafless horizontal stems or rhizomes; rachis, pedicels and calyces finely tomentose with scattered glandular based hairs and red or black vesicular glands. *Calyx* 5-11 mm long; lobes 2.5-5 times as long as tube. *Corolla* white, green or rarely pink; standard 6-10 mm long; wings lamellate; keel petals pouched. *Pod* 12-14 mm long, 4-7 mm wide, tomentose with scattered black glands. *Seeds* black, c. 2.5 mm diam. *Flowering* and *fruiting*: Sept - June. Fig. 24

Australian endemic from the Kimberley to southern coastal Qld, in Eucalypt savanna on well drained soils. Common in the DR. This species flowers near ground level in the late dry season and after dry season fires.

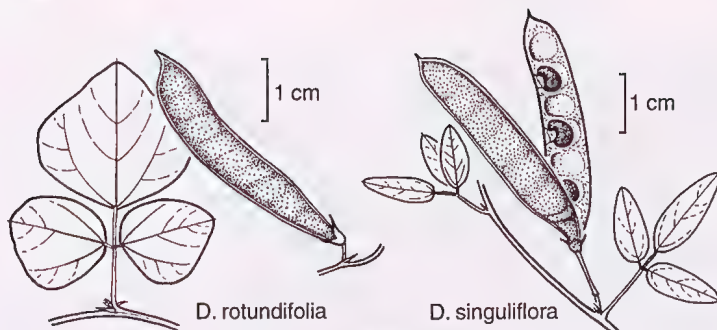
#### **F. pauciflora** Benth.

*Maughania* ("Moghania") *pauciflora* (Benth.) Kuntze

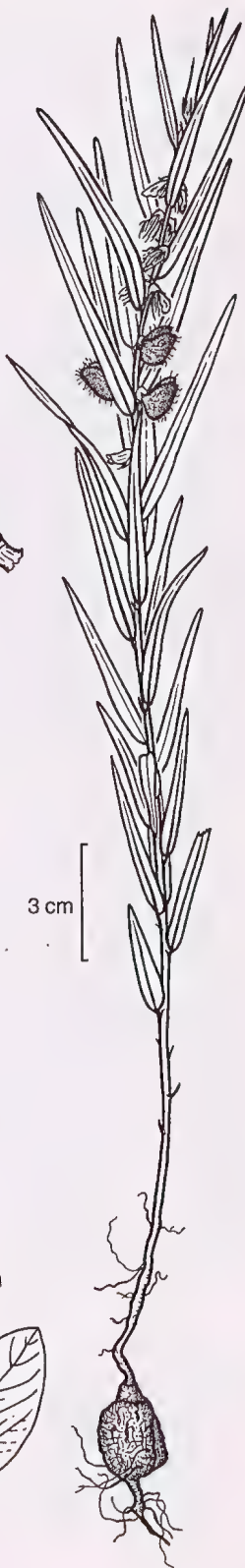
Erect or prostrate evergreen rhizomatous *shrub*. Vegetative parts grey-velutinous with simple hairs; underside of leaves and calyx with pale yellow vesicular glands obscured by tomentum. *Stipules* persistent, partly connate, 6-12 mm long. *Leaf* rachis 9-50 mm long; stipels absent; *leaflets* dorsiventral, oblanceolate, obovate, elliptic or narrowly elliptic, 15-65 mm long, 7-36 mm wide, L/W 1.5-3.6. *Inflorescence* of reduced axillary racemes of 1-several flowers, 15-30 mm long; also subterranean flowers and fruits may be present; bracts persistent, 2-6 mm long. Pedicels 2-3 mm long; bracteoles absent. *Calyx* 5-8 mm long, lobes attenuate, 3-7 times as long as tube. *Corolla* bright red; standard c. 6 mm long. *Pod* brown, 12-15 mm long, 8-10 mm wide, thinly tomentose. *Seeds* mottled brown-purple, c. 4.5 mm diam. *Flowering* and *fruiting*: Jan - Aug. Fig. 24

An Australian endemic, from the Kimberley to western Qld, in grassland on heavy clay soils. Not known from the DR.

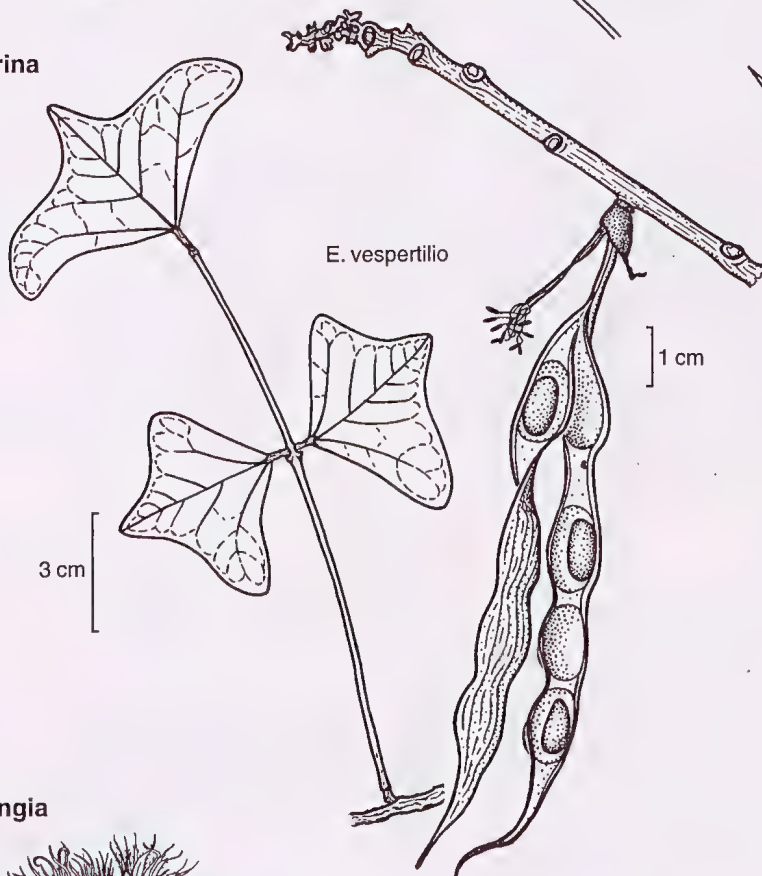
## Dunbaria



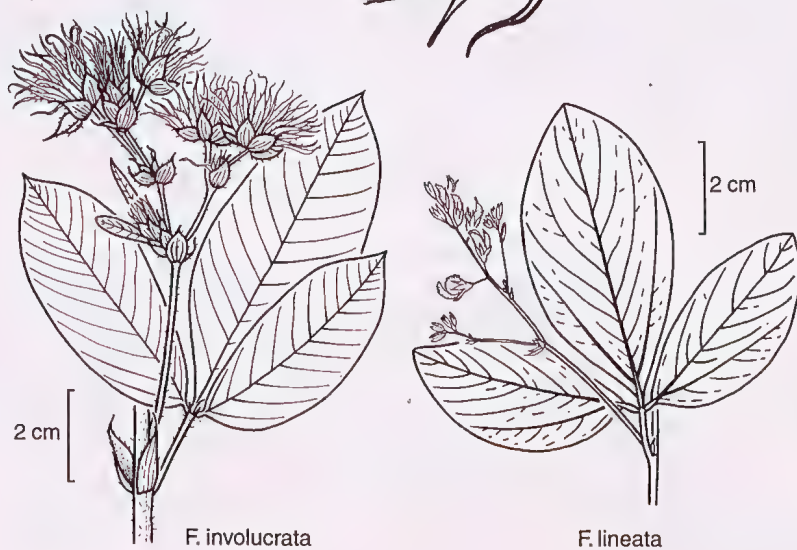
## Eriosema



## Erythrina



## Flemingia



*E. chinense*



**F. trifoliatrum** Domin*Maughania* ("Moghania") *trifoliatrum* (Domin) H.W.Li

Prostrate trailing perennial *herb* with annual stems. Stems tomentose with simple crisped hairs, often also with glandular based hairs and vesicular glands. *Stipules* persistent, partly connate on one margin, 5-9 mm long. *Leaf* rachis 5-40 mm long; *leaflets* obovate, broadly cuneate, suborbicular or elliptic, 14-49 mm long, 10-44 mm wide, L/W 0.9-1.8, strongly 3-nerved at base, with vesicular glands on both surfaces or only below, otherwise glabrate with simple hairs, base mostly cuneate, apex rounded, truncate or emarginate, mucronate. *Inflorescence* a few to many-flowered axillary panicle to 100 mm long; rachis, pedicels and calyces densely covered with glandular based and simple hairs, vesicular glands on calyx; bracts persistent, 2-3 mm long. *Calyx* 3.5-5 mm long; lobes attenuate, c. 1.5 times as long as tube. *Corolla* red to purple; standard c. 7 mm long; wings obscurely lamellate; keel with a slightly twisted beak. *Pod* pale brown, 9.5-12 mm long, 5.5-7 mm wide, thinly hairy with simple and glandular based hairs and vesicular glands. *Flowering* and fruiting: Aug - Apr. Fig. 24

Endemic to north west Australia, in the DR known from Tipperary - Litchfield area with 1 collection from near Katherine. In savanna on slightly clayey soils.

**F. 'Rum Jungle'**

Evergreen *shrub* to 1.5 m high. Vegetative parts sericeous, with scattered minute black vesicular glands on leaf blade and rachis. *Stipules* caducous. *Leaf* rachis 9-40 mm long, ridged or narrowly winged; *leaflets* elliptic, lanceolate or narrowly elliptic, 44-115 mm long, 18-54 mm wide, L/W 1.8-3.2, base rounded or cuneate, apex usually acute. *Inflorescence* of 1-4 dense axillary racemes to 100 mm long; stems, pedicels and calyces densely sericeous, with black vesicular glands and rarely yellow glandular based hairs; bracts 5-11 mm long. Pedicels 2-5 mm long. *Calyx* 9-15 mm long; lobes 4-7 times as long as tube. *Corolla* red, pink or purplish; standard 7-10 mm long; wings lamellate; keel petals pouched. *Pod* brown, 9-10 mm long, 4-5 mm wide, densely and finely tomentose with black glands and rarely with yellow glandular based hairs. *Seed* ± black, c. 3 mm diam. *Flowering* and fruiting: most months. Not illustrated.

Apparently endemic to the NT, and closely related to *F. macrophylla* (Willd.) Merr. and *F. parviflora*. Relatively common in the DR. Often associated with streams in rocky habitats and margins of rainforest.

**GALACTIA** P.Browne

Perennial-rooted shrubs and vines with annual aerial parts. Indumentum of simple hairs. *Stipules* persistent. Leaves simple, 1-foliolate or pinnately 3-5-foliolate; stipels persistent, filiform. *Inflorescence* of axillary racemes or rarely terminal panicles, the flowers 1-several on spaced, swollen nodes; bracts caducous. Bracteoles at base of calyx, persistent, narrowly triangular. *Calyx* 4-lobed. *Corolla* glabrous; standard shortly clawed, reflexed, obovate, auricles small, emarginate; keel and wing petals clawed; wings lamellate, lobes slightly pouched; keel petals joined in upper third, lobes pouched. Stamens 9+1; upper stamen shortly adnate to base of sheath, thickened, ± geniculate; filaments alternately long and short; anthers uniform, dorsifixed, versatile. Ovary hirsute; ovules numerous; style incurved, glabrous in upper part; stigma minute. *Pod* dehiscent, brown, linear-oblong, slightly curved or sigmoid. Seeds ± carunculate.

A pantropical genus of about 50 species; in Australia about 4 species, all in the DR.

- |                                                        |                        |
|--------------------------------------------------------|------------------------|
| 1. Vines, stems trailing or twining .....              | <b>G. tenuiflora</b>   |
| 1. Shrubs, stems erect or decumbent .....              | <b>2</b>               |
| 2. Vegetative parts glabrate; stems to 2 m high .....  | <b>G. megalophylla</b> |
| 2. Vegetative parts sericeous; stems <1.5 m high ..... | <b>3</b>               |
| 3. Leaf rachis to basal leaflets <5 mm long .....      | <b>G. muelleri</b>     |
| 3. Leaf rachis to basal leaflets >15 mm long .....     | <b>G. 'Litchfield'</b> |

**G. megalophylla** (F.Muell.) J.H.Willis

Erect *shrub* with cane-like stems to 2 m high. All parts except corolla glabrate with fine appressed hairs or parts of inflorescence sericeous. *Stipules* 1-3 mm long. *Leaves* simple, 1-foliolate or pinnately 3-5-foliolate; rachis to basal leaflets 1-40 mm, 7-60 mm overall; leaves or *leaflets* dorsiventral, coriaceous, broadly lanceolate, ovate or elliptic, 42-135 mm long, 16-96 mm wide, L/W 1.3-2.8, venation prominently reticulate, base rounded to cordate, apex acute to emarginate. *Inflorescence* axillary to 250 mm long or terminal to 450 mm long. Flowers 1-several at nodes; bracts c. 1 mm long. Pedicels 2-4 mm long; bracteoles 2-3 mm long. *Calyx* 7-13 mm long; lobes unequal, c. twice as long as tube. *Corolla* pale to deep mauve; standard 17-21 mm long. *Pod* 55-77 mm long, 4-7 mm wide. *Seeds* 9-15, brown, oblong to ellipsoid, 3-4 mm long, 2.5-3.5 mm wide; hilum towards one end. *Flowering*: Dec - Feb; *fruiting*: Jan - Mar. Fig. 24

Endemic to the NT, from the Victoria River district to western Arnhem Land. Relatively common in the DR, on shallow laterite or rocky slopes in Eucalypt savanna.

**G. muelleri** Benth.

Erect *shrub* to 1.5 m high; stems probably annual. All parts excluding corolla sericeous. *Stipules* c. 3 mm long. *Leaves* pinnately 3-foliolate, rarely 1-foliolate; rachis to basal leaflets c. 2 mm, 3-5(11) mm overall; *leaflets* lanceolate, 22-60 mm long, 7-32 mm wide, L/W 1.7-3.5. *Inflorescence* to 110 mm long, flowers 1-3 per node, widely spaced. *Calyx* 10.5-14.5 mm long; lobes c. 2/3 of total length. *Corolla* pink-purple; standard obovate, 13-18 mm long. *Pod* 25-62 mm long, 5-7 mm wide. *Seeds* 4-12, dark brown, 3.5-4 mm long, 2.6-3 mm wide; funicle minute. *Flowering* and *fruiting*: Dec - Mar. Fig. 24

Probably an NT endemic, occurring on rocky sites from the upper Fitzmaurice R. to north west of Noonamah. Relatively common in the DR.

**G. tenuiflora** (Sprengel) Wight & Arn.

Twining or trailing *vine*. All parts except corolla shortly and softly pubescent or upper leaf surfaces rarely glabrous. *Stipules* c. 3 mm long. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 18-65 mm, 25-82 mm overall; *leaflets* narrowly to broadly lanceolate, elliptic or oblong or rarely suborbicular, 20-80 mm long, 7-42 mm wide, L/W 1.2-2.5(4.7). *Inflorescence* axillary, racemose to 200(390) mm long; flowers 1-3 per node, distant, in distal half. Pedicels 1-3 mm long. *Calyx* 6-9 mm long; lobes  $\pm$  1/2 total length. *Corolla* purple; standard obovate, emarginate, 12-15 mm long. Ovules 7-9. *Pod* brown, 30-55 mm long, 5-7 mm wide. *Seeds* pale to dark brown, faintly spotted, 4-5 mm long, 3-4 mm wide; caruncle narrow. *Flowering* and *fruiting*: Jan - Feb. Fig. 24

A pantropical species; in Australia from the Kimberley to Qld. Common in the DR, favouring Eucalypt savanna but found in a variety of habitats.

**G. 'Litchfield'**

Erect *shrub* to c. 0.7 m high. All parts except corolla sericeous. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 15-30 mm, 22-42 mm overall; *leaflets* discolorous, narrowly lanceolate or narrowly elliptic to linear-oblong, 34-77 mm long, 5-20 mm wide, L/W 2.8-15. *Inflorescence* to c. 150 mm long. Pedicels c. 1 mm long. *Calyx* 7-8 mm long; lobes c. 2/3 total length. *Standard* c. 10 mm long. *Seeds* c. 10. *Flowering* and *fruiting*: July. Fig. 24

Known only from 3 collections from Eucalypt savanna in the Tipperary-Litchfield area.

**GLYCINE** J.C.Wendl.

Prostrate perennial vines with annual stems, often amphicarpic. Tomentum of simple hairs. *Stipules* persistent, striate. *Leaves* digitately or pinnately 3-foliolate. *Stipels* persistent, setaceous. *Inflorescence* of solitary axillary racemes, the flowers subtended by persistent narrow bracts towards the distal end. Bracteoles persistent, at the base of the calyx tube,  $\pm$  equal to calyx tube, linear. *Calyx* 5-lobed, upper pair partly connate. *Corolla* glabrous; standard shortly clawed, suborbicular, emarginate, wing and keel petals clawed to c. 1/2 their length. Stamens 9+1; filaments alternately long and short; anthers uniform, dorsifixed and versatile. Style glabrous, persisting on the fruit; stigma minute, capitate. Aerial pods straight, several-seeded; subterranean pods oblong, 1-seeded. Seeds in pods enveloped by dark resinous honey-combed tissue; aril minute.

About 18 species in warm regions of the Old World, 12 in Australia, 7 in the NT and 2 in the DR. *Glycine max* is the Soya Bean.



- |                                                                  |                       |
|------------------------------------------------------------------|-----------------------|
| 1. Leaves digitate; leaflets $\pm$ linear .....                  | <b>G. hirticaulis</b> |
| 1. Leaves pinnate; leaflets lanceolate, elliptic or oblong ..... | <b>G. tomentella</b>  |

### **G. hirticaulis** Tindale & Craven

Stems, leaf and inflorescence rachis hirsute with patent, stiff, yellowish hairs. *Stipules* c. 3 mm long. *Leaves* digitately 3-foliolate, rachis 20-70 mm long; *leaflets* dorsiventral,  $\pm$  linear, 42-125 mm long, 2.5-9 mm wide, L/W 9.7-14(28), margins incurved, 2° veins at right angles to midvein, thinly pilose, the hairs mostly white. *Inflorescence* (7)20-55(135) mm long; bracts c. 2 mm long. Pedicels c. 1 mm long. *Calyx* 4-6 mm long; lobes 1/3-1/2 total length, hispidulous. *Corolla* white or greyish white; standard 6-8 mm long. *Ovules* 2-3. *Aerial pods* 9-23 mm long, c. 5 mm wide, with white and yellow adpressed hairs; subterranean pods c. 8 mm long, c. 5 mm wide. *Seeds* brown, c. 3.8 mm long, 2.5 mm wide. *Flowering* and fruiting: Feb - May (subterranean fruit: May). Fig. 24

An NT endemic occurring in Eucalypt savanna on laterite from the Victoria R. to the Alligator Rivers. Relatively rare in the DR.

### **G. tomentella** Hayata

All parts except corolla patent or retrorsely hirsute, the hairs often of 2 lengths, usually yellowish.

*Stipules* 3-4 mm long. *Leaves* pinnately 3-foliolate; rachis to basal leaflets 5-60 mm, 7-72 mm overall, rachis above basal leaflets to 12 mm long; *leaflets* discolorous, elliptic or ovate, 25-50(70) mm long, 11-37 mm wide, venation prominent below; basal leaflets asymmetric, smaller than the terminal. *Inflorescence* to 100(180) mm long, flowers few, towards distal end; rarely floral axis reduced. Pedicels c. 2 mm long. *Calyx* 3.5-5(8) mm long; lobes c. 1/2 total length. *Corolla* mauve (drying reddish); standard c. 6(9) mm long. Upper *stamen* with a broad filament. *Style* short and geniculate. *Ovules* 3-8. *Aerial pods* brown, 11-27 mm long, 3-4.5 mm wide; subterranean pods pale coloured, 7-9 mm long, 3.5-6 mm wide. *Seeds* 1-5, pale to dark brown, squared, 1.8-3 mm diam. *Flowering*: Jan - May; fruiting: Mar - July. Fig. 24

Known from Papua New Guinea, Philippines, Taiwan, and tropical Australia. Uncommon in the DR but more frequent in drier regions to as far south as Elliott. Occurs on a variety of well drained soils in Eucalypt savanna. The tuberous tap root is sometimes eaten by aboriginal people (e.g. Mornington Is., Arnhem Land).

## **GOMPHOLOBIUM** Sm.

A genus of c. 37 species, most endemic to Australia; 1 extending to Indonesia and another to New Guinea. Four species occur in the NT with 1 in the DR.

### **G. subulatum** Benth.

*Burtonia subulata* (Benth.) Benth.

An erect or spreading evergreen perennial *shrub* to 1 m tall. Glabrous throughout except for minute simple hairs in the axils, on the leaf rachis and on the inside margins of the calyx lobes. *Stipules* minute. *Leaves* imparipinnate; rachis to basal leaflets 1-7 mm, 7-32 mm overall; stipels absent; *leaflets* in (2)3-5(7) pairs, discolorous, linear, narrowly oblanceolate or filiform with recurved margins, 6-32 mm long, 0.2-5 mm wide. *Inflorescence* terminal, racemose, to 120 mm long, of 1-several flowers; bracts persistent, narrowly triangular to 2.2 mm long. Pedicels 6-11 mm long; bracteoles minute, central on pedicels. *Calyx* 5-8 mm long; lobes  $\pm$  equal, lanceolate, shortly

connate at base. *Corolla* yellow; standard orbicular. *Stamens* 10, free. *Ovary* shortly stipitate; ovules 2, on curved funicles. *Pod* pale brown, ellipsoid, inflated, transversely elongate and rotated so that seeds attach at the apex and style at the side, 7-8 mm long, 4.5-5 mm wide, smooth. *Seeds* 1-2, pale brown, reniform, c. 2 mm long, 1.2 mm wide, minutely hoary-tomentose except for a thin transparent wrinkled membrane extending from the hilum around the narrow end; funicles c. 3 mm long, thick. *Flowering* and fruiting: most months. Fig. 24

Associated with sandstone in north western Australia (the Kimberley and Top End). In the DR, known only from the Tabletop Range in Litchfield NP, but otherwise common in the Top End.

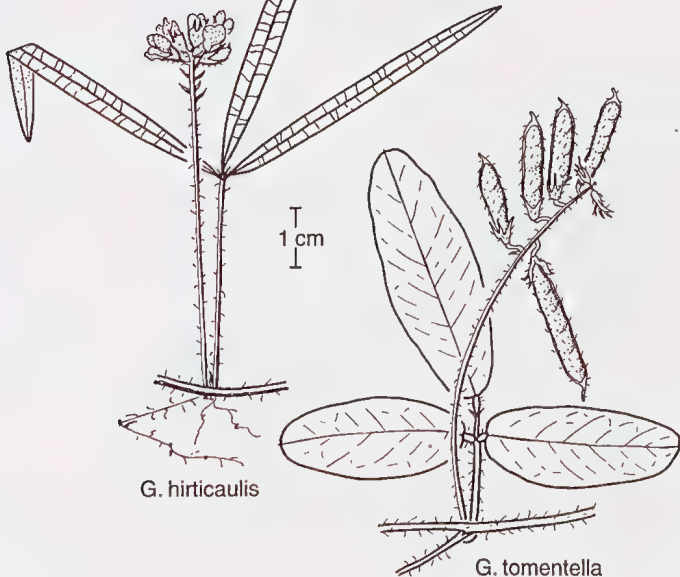
**Flemingia**



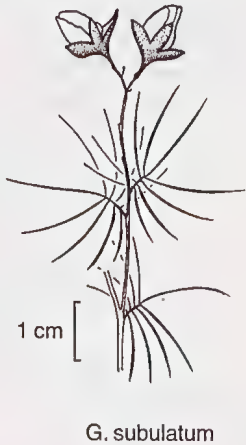
**Galactia**



**Glycine**



**Gompholobium**





# INDIGOFERA L.

Peter G. Wilson & Ross Rowe

Annual or perennial shrubs or herbs. Indumentum typically of 2-armed hairs, sometimes with multicellular and/or gland-tipped hairs as well. Stipules present, sometimes spinescent and persistent. Leaves simple, 1-foliolate, 3-foliolate or imparipinnate, opposite, discolorous; stipels present in some species, persistent. Inflorescence a pedunculate axillary raceme; flowers pedicellate; bracts semipersistent. Calyx lobes 5, subequal or the lowermost longer. Corolla red or pink to purple, rarely glabrous; standard lacking calli; wings held horizontally adjacent to the keel; keel with lateral pockets. Stamens 9+1; filaments alternately long and short; anthers attached near base, versatile, apiculate. Ovary sessile, usually pubescent; ovules 1, 2 or numerous; style incurved, glabrous; stigma capitate. Pod straight or curved, spreading to descending, rarely ascending, globose to linear, terete or sometimes angular, usually dehiscent, the base of the pod often staying attached to the plant as the remainder is shed; endocarp very often spotted. Seeds separated by papery or pithy outgrowths of the endocarp, globose to cylindrical or cuboidal; hilum central or towards one side; ecarunculate.

A genus of over 700 spp. found in tropical & subtropical areas. Around 53 species occur in Australia with 11 species known from the DR out of 25 occurring in the NT.

|     |                                                                                                                                          |                        |
|-----|------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1.  | Leaves simple or 1-foliolate .....                                                                                                       | 2                      |
| 1.  | Leaves with 3 or more leaflets .....                                                                                                     | 4                      |
| 2.  | Leaf simple; pod globular; seed solitary .....                                                                                           | <b>I. linifolia</b>    |
| 2.  | Leaf 1-foliolate, rachis articulated; pod terete; seeds >6 .....                                                                         | 3                      |
| 3.  | Blade >20 mm wide .....                                                                                                                  | <b>I. schultzeana</b>  |
| 3.  | Blade <10 mm wide .....                                                                                                                  | <b>I. parviflora</b>   |
| 4.  | Leaflets 3 .....                                                                                                                         | 5                      |
| 4.  | Leaflets usually 5 or more .....                                                                                                         | 10                     |
| 5.  | Leaflets with vesicular glands on underside .....                                                                                        | 6                      |
| 5.  | Leaflets lacking vesicular glands .....                                                                                                  | 7                      |
| 6.  | Stipules c. 1 mm long; pod 7-20 mm long; seeds 3-7 .....                                                                                 | <b>I. trifoliata</b>   |
| 6.  | Stipules 3-4 mm long; pod 5-6 mm long; seeds 1-2 .....                                                                                   | <b>I. glandulosa</b>   |
| 7.  | Pods 4-angled .....                                                                                                                      | 8                      |
| 7.  | Pods terete or compressed-terete .....                                                                                                   | 9                      |
| 8.  | Inflorescence 60-160 mm long; pod 1-1.8 mm wide .....                                                                                    | <b>I. polygaloides</b> |
| 8.  | Inflorescence 25-50 mm long; pod 2-3 mm wide .....                                                                                       | <b>I. trita</b>        |
| 9.  | Leaflets <6 mm wide .....                                                                                                                | <b>I. parviflora</b>   |
| 9.  | Leaflets >10 mm long .....                                                                                                               | <b>I. saxicola</b>     |
| 10. | Gland-tipped hairs always present, at least on the ovary or fruit .....                                                                  | <b>I. colutea</b>      |
| 10. | Gland-tipped hairs absent .....                                                                                                          | 11                     |
| 11. | Hairs spreading, very unequally 2-armed, appearing simple .....                                                                          | <b>I. hirsuta</b>      |
| 11. | Hairs appressed, equally 2-armed .....                                                                                                   | 12                     |
| 12. | Leaflets linear, narrowly lanceolate or narrowly elliptic, <6 mm wide .....                                                              | <b>I. parviflora</b>   |
| 12. | Leaflets ovate or obovate, usually >4 mm wide .....                                                                                      | 13                     |
| 13. | Multicellular hairs present between leaflet pairs; leaflets in 3-9(11) pairs,<br>10-22 mm wide; pods >2 mm wide .....                    | <b>I. saxicola</b>     |
| 13. | Multicellular hairs between leaflet pairs absent or inconspicuous;<br>leaflets in (7)9-13 pairs, 4-12(19) mm wide; pods <2 mm wide ..... | <b>I. tinctoria</b>    |

**I. colutea** (Burm.f.) Merr.*I. viscosa* Lam.

Erect or occasionally prostrate, annual or short lived perennial *herb*, to 0.5 m high. Indumentum of appressed, hyaline to green, equally 2-armed hairs, sparse to dense on stems; spreading, gland-tipped hairs usually present on vegetative parts. *Stipules* subulate, 1-3(5) mm long. *Leaves* pinnate; rachis furrowed, multicellular hairs between leaflet pairs absent; *leaflets* 7-15(21), elliptic to obovate, hairs sparse to moderately dense, appressed, apex obtuse, or acute and shortly mucronate; lateral leaflets 2.5-9(13.5) mm long, 1-3(6.5) mm wide, terminal leaflet slightly larger. *Inflorescence* 15-50(90) mm long. *Calyx* 1.5-2.8 mm long, lobes longer than the tube. *Standard* red, obovate to elliptic. *Pod* ascending or spreading, brown, terete or slightly torulose, 10-25 mm long, 1.5-2 mm wide, indumentum of moderately dense to dense appressed hairs with spreading, gland-tipped hairs mostly present, apex shortly pointed; endocarp spotted. *Seeds* (3)7-13. *Flowering* and fruiting: Feb - Apr. Fig. 26

Through the Old World tropics from north east Africa to New Guinea and tropical Australia, extending to SA and northern NSW. Common in the DR. Grows predominantly on sandy or loamy soils, on disturbed sites or in areas of open vegetation.

**\*I. glandulosa** J.C.Wendl.*I. glandulosa* Willd.

Erect, annual or short-lived perennial *herb* to 0.75 m high. Indumentum of spreading, unequally 2-armed hairs, moderately dense on the stems. *Stipules* linear, 3-4 mm long. *Leaves* 3-foliolate; rachis terete to slightly furrowed, multicellular hairs between leaflet pairs absent; *leaflets* narrow obovate, hairs fine, appressed to shortly spreading, lower surface prominently spotted with brown to black vesicular glands, apex obtuse to slightly emarginate, shortly mucronate; basal leaflets 20-35 long, 6-10 mm wide; terminal leaflet somewhat larger. *Inflorescence* 10-15 mm long, shorter than the leaf. *Calyx* to 3 mm long, lobes longer than the tube. *Standard* pink, elliptic; keel spotted with vesicular glands. *Pod* descending, short-cylindrical, 5-6 mm long, with 4 ridges bearing rows of narrow-triangular projections, hairy; apex rounded, with a short point; endocarp not spotted. *Seeds* 1-2. *Flowering*: Jan - Feb; fruiting: Mar. Fig. 25

Occurs from India to Indonesia (Java to Timor) and Australia. Uncommon in Qld and in the northern NT and WA. The only specimen from the DR was collected in 1881.

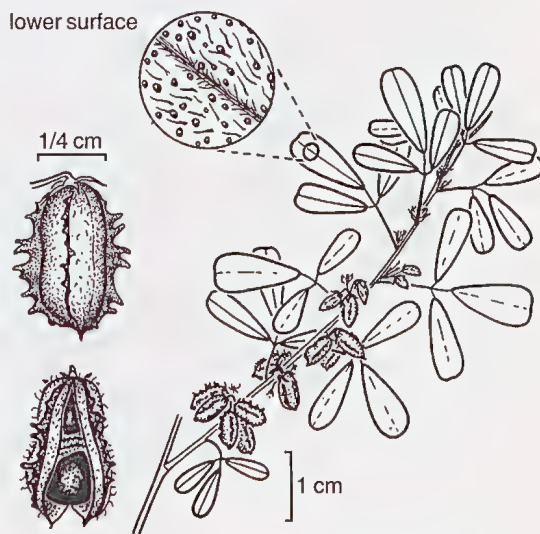
**I. hirsuta** L.

Usually an erect annual *herb* or *subshrub*; to 1(1.5) m high. Indumentum of spreading, white, golden, red-brown or dark brown, very unequally 2-armed hairs (appearing simple), sparse to moderately dense on the stems. *Stipules* subulate, (2.5)5-10(14) mm long. *Leaves* pinnate, rachis furrowed, multicellular hairs between leaflet pairs absent, or few and inconspicuous; *leaflets* 3-9(11), obovate, sometimes elliptic, hairs sparse to dense, spreading or shortly spreading, apex obtuse and shortly mucronate; lateral leaflets (4)6-25(45) mm long, (2)4.5-16(25) mm wide; terminal leaflet a little longer. *Inflorescence* (20)60-200(345) mm long, longer than leaf. *Calyx* 3-7 mm long; lobes longer than tube. *Standard* red, rarely pinkish or yellowish, ovate to obovate or orbicular. *Pod* reflexed, red-brown, terete or shortly cylindrical, 10-20(26) mm long, 2-3.5 mm wide, indumentum of dense to moderately dense, unequally 2-armed, spreading hairs, apex shortly pointed; endocarp spotted. *Seeds* 6-8(9). *Flowering*: Jan - Apr; fruiting: Feb - July. Fig. 26

Widespread in the Old World tropics and across tropical Australia, extending to northern NSW. Introduced to tropical America. Common in the DR. On a variety of substrates from sandy to clay soils, in Eucalypt savanna or on disturbed sites.

**I. linifolia** (L.f.) Retz.

Usually an erect annual *herb* to 0.3(0.5) m high. Indumentum of appressed, hyaline, white or greenish equally 2-armed hairs, moderately dense to dense on stems. *Stipules* triangular, 1-3 mm long. *Leaves*



Indigofera glandulosa



apparently simple, petiolate; *blades* linear, rarely narrowly lanceolate to narrowly oblanceolate, (6)10-35(50) mm long, 1-3(4) mm wide, hairs moderately dense or dense, appressed, apex acute and shortly mucronate. *Inflorescence* (2)5-15(25) mm long, shorter than leaf. *Calyx* 1.5-4 mm long, lobes longer than tube. *Standard* red, obovate to orbicular. *Pod* ascending, globular, 2-3 mm long, 1.5-1.8 mm wide, white or grey strigose with dense, appressed hairs; apex shortly beaked; endocarp not spotted. *Seed* 1. *Flowering*: Feb - Mar; *fruiting*: Mar - May. Fig. 26

Throughout the Old World tropics from north east Africa to tropical Australia extending to SA and northern NSW. Common in the DR. Recorded from a wide range of well drained habitats, but especially disturbed sites.

### ***I. parviflora* Wight & Arn.**

Erect, annual *herb* to 0.75(1.5) m high. Indumentum of appressed, hyaline, white or greenish equally 2-armed hairs, sparsely distributed on stems. *Stipules* narrow and triangular or subulate, 1-2 mm long. *Leaves* usually pinnate, rachis furrowed, multicellular hairs between leaflet pairs absent; *leaflets* (1,3)5-11, linear, narrowly lanceolate, sometimes narrowly elliptic or ovate, usually glabrous above, sparsely to moderately densely appressed-hairy below, apex obtuse and shortly mucronate; lateral leaflets opposite (10)20-42 mm long, 1-6 mm wide; terminal leaflet a little longer. *Inflorescence* 10-30 mm long, shorter than leaf. *Calyx* 1.5-3 mm long, lobes equal to or longer than the tube. *Standard* pale red to red, obovate, glabrous. *Pod* descending, terete or compressed-terete, 20-40 mm long, 2-3 mm wide, yellowish to light brown, indumentum of moderately dense appressed hairs; apex upturned and shortly beaked; endocarp not spotted. *Seeds* 10-14. *Flowering*: Feb - May; *fruiting*: Mar - May. Fig. 26

Occurs in South Africa, north east Africa and India. In tropical Australia it commonly occurs on heavier soils in grasslands and Eucalypt savanna, as well as on roadsides. Relatively uncommon in the DR. A number of specimens from an area just north of Pine Creek have leaves that are mainly 1- or 3-foliate. Although the species is quite variable, this phenomenon is remarkable since such leaves are usually found only occasionally on individuals with higher leaflet numbers rather than in whole populations. The species has recently been transferred to *Indigastrum* as *I. parviflorum* (Wight & Arn.) Schrire (Schrire, 1992).

### ***I. polygaloides* M.Scott**

Prostrate perennial *herb* 0.1-0.3 m high, with a

thickened taproot. Indumentum of appressed, white, 2-armed hairs, moderately dense on the angular stems. *Stipules* narrowly triangular to linear, 2-4 mm long. *Leaves* 3-foliate; rachis furrowed, multicellular hairs between leaflet pairs absent; *leaflets* obovate to elliptical, hairs sparse to moderately dense, unequally 2-armed and spreading above, equally 2-armed and appressed below, apex obtuse and apiculate; basal leaflets opposite, 5-20 mm long, 3-12 mm wide; terminal leaflet slightly larger. *Inflorescence* 60-160 mm long, exceeding the leaf. *Calyx* 2.5-4 mm long, lobes longer than the tube. *Standard* pink to purplish-red, obovate. *Pod* spreading, straight or rarely curved, 4-angled, 18-24 mm long, c. 1.5 mm wide, brown, indumentum of sparse to moderately dense, appressed hairs, apex shortly beaked; endocarp not spotted. *Seeds* mostly 7-10. *Flowering*: Jan - Mar; *fruiting*: Mar - May. Not illustrated.

Endemic to Australia, from a few scattered localities in Qld, NT and WA. Occurs on well drained stony or sandy soils in open woodland. The species is similar to and has previously been included in *I. trita* but differs in having a swollen perennial taproot, long inflorescences with paler flowers, and a more slender fruit.

### ***I. saxicola* F.Muell. ex Benth.**

Erect perennial *shrub* to 2 m high. Indumentum of appressed, hyaline or white (rarely brown) equally 2-armed hairs, sparse to moderately dense on young stems. *Stipules* triangular, 0.5-1.2 mm long. *Leaves* pinnate, rachis furrowed, multicellular hairs between leaflet pairs sparse to moderately dense; *leaflets* 5-9(11), ovate to obovate, glabrescent or hairs sparse and appressed, apex acute, or obtuse and apiculate; lateral leaflets 15-30(40) mm long, 10-22 mm wide; terminal leaflet to 45 mm long and 30 mm wide. *Inflorescence* usually 55-210 mm long, longer or shorter than leaf. *Calyx* 1-2 mm long, lobes shorter than or equal to the tube. *Standard* pink to purple, ovate. *Pod* ascending to descending, terete, 20-40 mm long, 2-3.5 mm wide, brown to dark brown, indumentum of moderately dense, appressed or slightly spreading hairs, apex acute, shortly pointed; endocarp spotted. *Seeds* 4-10. *Flowering*: Nov - Feb; *fruiting*: Mar - June. Fig. 26

Endemic to the NT. Occurs in Eucalypt savanna on sandy, lateritic or shale-derived soils, frequently associated with stony ridges and escarpments. Common in the DR. In the Adelaide River - Batchelor area, there is a form with 3-5 leaflets that are larger than those of the typical form (30-70 mm long, 18-50 mm wide, terminal leaflet to 80 mm long and 70 mm wide). This form may have arisen from intergradation of *I. saxicola* and *I. schultzeana*.

**I. schultziiana** F.Muell.

Erect perennial *subshrub* with ?annual aerial parts, to 0.6 m high. Indumentum of appressed, hyaline to brown, equally 2-armed hairs, sparse on young stems. *Stipules* triangular, 0.5-1 mm long. *Leaves* 1-foliolate, 40-115 mm long, articulate on the rachis, pulvinate; rachis furrowed, multicellular hairs at base of petiole moderately dense; *blades* ovate to orbicular, 25-103 mm long, 20-60 mm wide, glabrous or hairs small, sparse and appressed, apex obtuse or acute and apiculate. *Inflorescence* 35-115 mm long, longer than leaf. *Calyx* 1.5-2.3 mm long, lobes equal to or shorter than the tube. *Standard* lavender-pink, ovate. *Pod* ascending to descending, terete, 21-40 mm long, 2.5-3 mm wide, brown, hairs small, moderately dense, appressed, apex shortly beaked; endocarp spotted. *Seeds* 6-8. *Flowering* and fruiting: Aug - Jan. Fig. 26

Rare and endemic to the DR. Known only from Eucalypt savanna at Rum Jungle and in the Finnis River area.

**\*I. tinctoria** L.

Erect or spreading suffrutescent *shrub* to 1(2) m high, with woody rootstock. Indumentum of appressed, hyaline, golden or brown, equally 2-armed hairs, sparse to dense on the stems. *Stipules* narrowly triangular, 1-3.5 mm long. *Leaves* pinnate, rachis slightly furrowed, multicellular hairs between leaflet pairs absent or inconspicuous; *leaflets* (7)9-13, obovate, glabrous above, hairs appressed, sparse to moderately dense below, apex obtuse and emarginate, or mucronate; lateral leaflets (5)10-25(35) mm long, 4-12(19) mm wide; terminal leaflet slightly broader. *Inflorescence* (6)15-55(95) mm long, shorter than leaf. *Calyx* 1.2-2.1 mm long; lobes equal to tube. *Standard* pink to reddish, ovate to orbicular. *Pod* descending, brown, terete and slightly torulose, 23-35 mm long, 1.5-2 mm wide, glabrescent or hairs sparse and appressed, apex upturned and shortly beaked; endocarp spotted. *Seeds* 7-10. *Flowering*: Oct - Nov, Feb - May; fruiting: Nov, Apr - June. Fig. 26

Occurs throughout the Old World tropics, its distribution extended through cultivation for indigo dye production. Introduced to the New World tropics and northern Australia. In eastern Qld and the DR it is a weed on disturbed sites, mostly in urban areas.

**I. trifoliata** L.

Erect, or spreading (rarely prostrate or trailing) perennial *herb* or *subshrub* with woody rootstock, to 0.6 m high (rarely to 1.2 m). Indumentum of appressed, hyaline to pale brown, equally or unequally 2-armed hairs, sparse to moderately dense on the stems. *Stipules* linear, 0.6-0.9 mm long. *Leaves* 3-

foliolate; rachis furrowed, multicellular hairs between leaflet pairs sparse, inconspicuous; *leaflets* narrow elliptic to oblanceolate or obovate, hairs sparse, appressed or shortly spreading, lower surface prominently spotted with dark orange vesicular glands; apex obtuse or acute and shortly mucronate; basal leaflets opposite, 12-27 mm long, 3-6.5(9) mm wide; terminal leaflet slightly larger. *Inflorescence* 3.5-8(14) mm long, shorter than leaf. *Calyx* 1.5-2.6 mm long, lobes longer than the tube. *Standard* red, ovate to obovate. *Pod* descending, terete with 4 thickened longitudinal ridges, 7-20 mm long, 1-2 mm wide, dark brown to black, glabrescent to moderately densely hairy, apex shortly beaked; endocarp not spotted. *Seeds* 3-7. *Flowering*: Dec - Mar; fruiting: Feb - Apr. Fig. 26

Distributed from Pakistan to South China and Malaysia. In tropical Australia, found in higher rainfall areas. Recorded from open communities on a variety of soil types. Uncommon in the DR.

**I. trita** L.f. subsp. *trita*

Semi-erect annual or short-lived perennial *herb* or *subshrub* to 0.45 m high. Indumentum of appressed, grey, equally 2-armed hairs, dense on the angular stems. *Stipules* narrowly triangular to linear, 1.5-3 mm long. *Leaves* 3-foliolate; rachis furrowed, multicellular hairs between leaflet pairs few and inconspicuous; *leaflets* obovate to elliptic, hairs moderately dense to dense, unequally 2-armed and spreading above, equally 2-armed and appressed below, apex obtuse and mucronate; basal leaflets opposite, 9-20 mm long, 4-10 mm wide; terminal leaflet slightly larger. *Inflorescence* 25-50 mm long, shorter to slightly longer than the leaf. *Calyx* 2.5-5 mm long, lobes longer than the tube. *Standard* orange-red or red, elliptic to obovate. *Pod* spreading, straight, 4-angled, 22-39 mm long, 2-3 mm wide, pale brown, indumentum of dense, appressed hairs, apex shortly beaked; endocarp not spotted. *Seeds* mostly 8-10. *Flowering*: Jan - Mar; fruiting: Mar - May. Fig. 26

Distributed through Pakistan, India, Sri Lanka and Burma to Indonesia. In tropical Australia the species occurs in open forest and woodland communities on clay or alluvial soils, and less often on sandstone and limestone. Uncommon in the DR. Although this is a variable taxon in Australia, most overseas workers have included Australian specimens in *I. trita* subsp. *trita*. Typical *I. trita* subsp. *trita* is described as having short inflorescences and equally-armed, appressed hairs on both leaf surfaces. Under this definition, the only typical collections in Australia come from the Hamersley Range area in WA.



# Indigofera

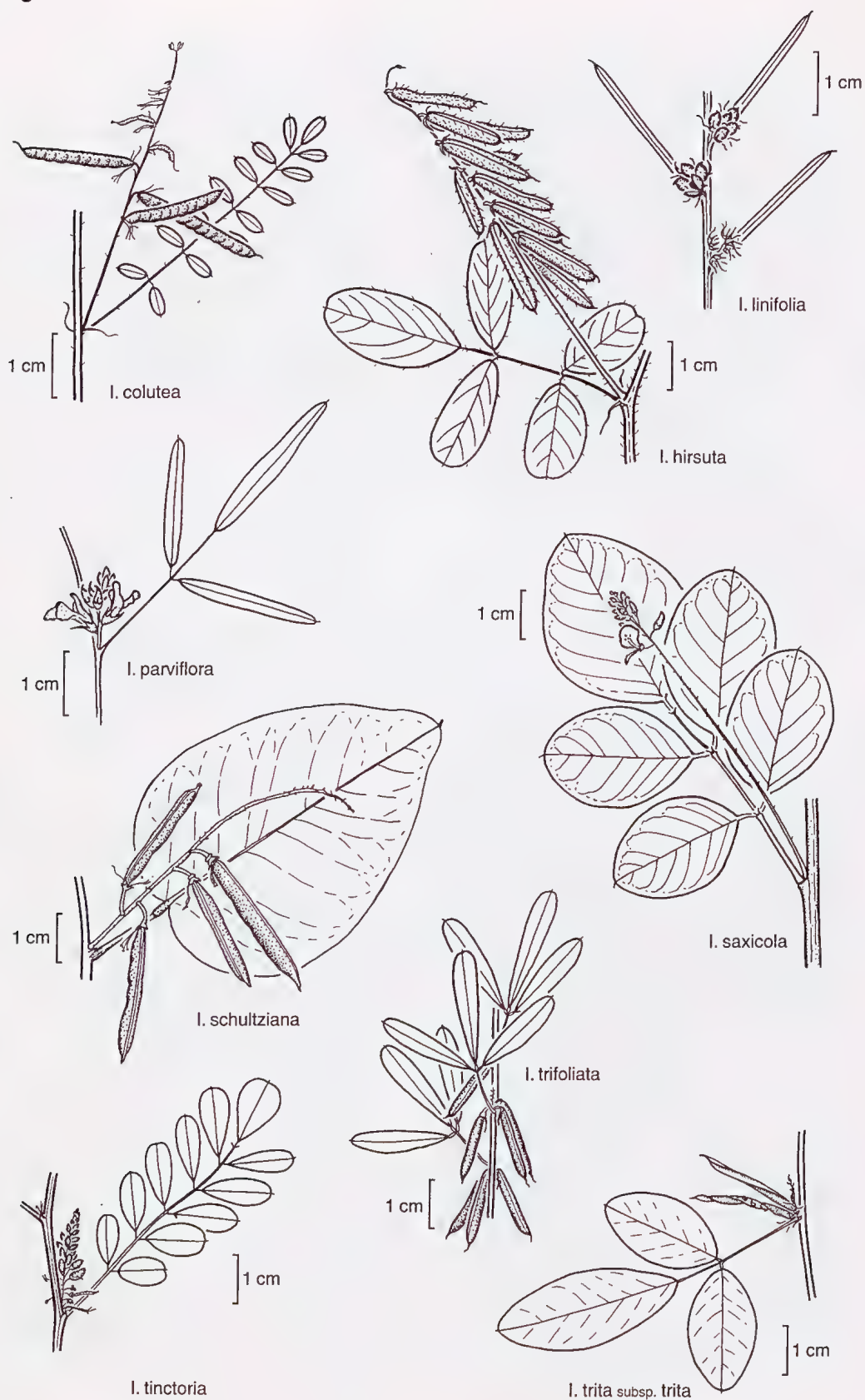


Fig. 26

## JACKSONIA R.Br. ex Sm.

A genus of c. 37 species endemic in Australia, with most species in south west WA. Seven named species in the NT; 1 from the DR.

### *J. dilatata* Benth.

An erect, grey-green perennial *shrub* to 4 m tall, outer branchlets angular. Stipules absent. *Leaves* reduced to persistent brown bracts c. 1.5 mm long, the ultimate flowering branchlets expanded to resemble flat leaves (cladodes). *Cladodes* elliptic to narrowly elliptic, 26-150 mm long, 4-20 mm wide, densely and shortly sericeous with hyaline hairs. *Inflorescence* borne on the ends of the cladodes, spicate, crowded, 6-45 mm long; bracts ovate-elliptic, 3-6 mm long, acuminate. *Calyx* 7-8 mm long, sericeous; tube c. 2 mm long; lobes 5, equal; c. 2 mm wide. *Corolla* yellow, glabrous  $\pm$  equal to calyx; standard orbicular to reniform, 6-7 mm long, 8-9 mm wide; wings oblong, 5-7 mm long, c. 2 mm wide;

keel 5-6 mm long, 2.5 mm wide. *Stamens* 10, arising from a short sheath of tissue adnate to the calyx tube; filaments free, of varying lengths; anthers uniform, dorsifixed, versatile. *Ovary* sericeous; ovules 2. *Pod* brown, elliptic, flattened, c. 5 mm long, 3.5 mm wide, sericeous with brown hairs. *Seed* 1, longitudinal in pod, mottled, olivaceous, reniform, c. 2.7 mm long, 1.5 mm wide; hilum central; ecarunculate. *Flowering* and fruiting: May - Nov. Fig. 27

Commonly forming thickets on sandy soils, on skeletal soils on sandstone, on beach dunes, and on lateritic soil in less fire prone habitats. Used by Aboriginal people in the Top End to treat diarrhoea (Abor. Comm. NT, 1988) or as an antiseptic (Levitt, 1981).

## LEPTOSEMA Benth.

An Australian endemic genus of c. 6 species (NT, WA, SA); 4 in the NT, 1 in the DR.

### *L. sp. [Brachysema uniflorum Benth.]*

Prostrate, rarely erect, perennial *shrub*. Stems expanded into cladodes, 2-4 mm wide, glabrous or glabrate, the hairs simple, hyaline. Stipules absent. *Leaves* scale-like. *Flowers* solitary; pedicels, calyx and pod thinly sericeous. Pedicels 8-14 mm long, dilated at apex; bracteoles minute, caducous, in middle of pedicel. *Calyx* coriaceous, 6-8 mm long, lobed almost to the base; lobes 5,  $\pm$  equal. *Corolla* dark red, glabrous; standard sessile, deeply constricted about the middle, narrow-navicular, shorter than the other petals; wing and keel petals shortly clawed; wings obscurely lamellate; keel petals pouched, joined

at apex. *Stamens* 10; filaments free; anthers dorsifixed near base. *Ovary*  $\pm$  sessile, sericeous, c. 16-ovuled; style stout, shorter than the ovary, glabrous in the upper part; stigma minute. *Pod* grey,  $\pm$  woody, inflated, dehiscent, ellipsoid, 17-28 mm long, 5-9 mm wide. *Seeds* pale brown to black, reniform, c. 4 mm long, 2.2 mm wide, smooth or with scalariform patterning, ecarunculate. *Flowering* and fruiting: Apr - July. Fig. 27

An NT endemic; in the DR known from Melville Is., otherwise restricted to Arnhem Land. Currently known as *Brachysema uniflorum*; transfer of this species to *Leptosema* is proposed.

## MACROPTILIUM (Benth.) Urban

Annual or perennial vines or herbs. Hairs where present appressed, simple with slightly swollen bases, the pods also with short conical tuberculate glandular hairs. Stipules persistent, striate. Leaves digitately 3-foliolate; stipels persistent. Inflorescence axillary, racemose; flowers paired, arising from swollen glandular nodes. Bracts and bracteoles caducous, striate. Calyx lobes 5,  $\pm$  equal, to c. 1/3 of total length. Corolla glabrous except for inner margin of keel petals; standard pink or pinkish, reflexed, broadly clawed, with obscure auricles, calli absent, apex emarginate; wings greatly exceeding other petals, long-clawed; keel petals long-



clawed, outer margin adnate above the claws, twisted, incurved. Stamens 9+1, upper stamen dilated and geniculate at base; anthers uniform, basifixed. Ovary sessile, sericeous, many-ovuled; style thickened in upper part, twisted through 90° and geniculate to form a hook, bearded below the capitate stigma. Pod brown, straight, cylindrical, with spongy septa, the dehiscent valves spirally twisted. Seeds mottled, longitudinal in pod; hilum central; ecarunculate.

About 20 species, native to the New World. Two introduced species in the NT, both widespread in the DR and tropical Australia.

1. Twining vine; lower leaflets lobed, leaf bases cordate or rounded ..... **M. atropurpureum**
1. Erect herb (rarely twining); leaflets entire, bases cuneate ..... **M. lathyroides**

**\*M. atropurpureum (DC.) Urban**

Twining annual or perennial *vine*. Vegetative parts sericeous except upper leaf surfaces which are sparsely so, hairs white with swollen bases. *Stipules* 2-5 mm long. *Leaf* rachis to basal leaflets 35-60 mm, 37-65 mm overall; *leaflets* strongly discoloured, ovate, elliptic, lanceolate or deltoid, irregularly lobed, the basal leaflets usually unequally so, 28-52 mm long, 15-38 mm wide, L/W 1.2-1.8, base  $\pm$  cordate, apex acute or obtuse. *Inflorescence* to 350 mm long; flowers in upper third of rachis. Pedicels minute. *Calyx* 6-7.5 mm long, sparsely tomentose. *Standard* c. 15 mm long; wings dark purple to almost black. *Pod* 60-80 mm long. *Seeds* 8-12. *Flowering* and fruiting: most months. Fig. 27

**Siratou**

Pantropical. Widespread in northern Australia in disturbed habitats. Introduced as a pasture species.

**\*M. lathyroides (L.) Urban**

Erect annual *herb*, sometimes climbing, to 1 m high; sparsely adpressed-hairy or glabrous except for the pod which is thinly sericeous. *Stipules* 7-9 mm long. *Leaf* rachis to basal leaflets 20-55 mm, 27-70 mm overall; *leaflets* slightly discoloured, lanceolate, deltoid or rarely elliptic, 30-68 mm long, 14-30 mm wide, L/W 1.9-3, entire, bases cuneate, apices obtuse to acute. *Inflorescence* to 440 mm long; flowers in upper half of rachis. *Calyx* 6-7 mm long. *Standard* c. 14 mm long; wings deep red. *Pod* 85-105 mm long, c. 3 mm wide. *Seeds* 16-30, 3-3.5 mm long, c. 2.5 mm wide. *Flowering*: Dec - Mar; fruiting: Jan - July. Fig. 27

**Phasey Bean**

A pantropical weed with a preference for heavy soils. Relatively common on the margins of coastal plains; also used for pasture improvement.

## MUCUNA Adans.

Perennial vines with trailing or twining stems. *Stipules* caducous. Leaves pinnately 3-foliolate; leaflets discoloured, ovate, basal leaflets asymmetric. *Stipels* present. *Inflorescence* axillary, flowers crowded towards distal end of rachis, 1-3 per node; bracts and bracteoles caducous. *Standard* not reflexed, c. 1/2 as long as wings and keel, glabrous, auricles folded; wings hairy on outside towards base and fringed on lower margins, basal lobe thickened and folded; keel clawed. Stamens 9+1; anthers versatile, dimorphic, longer fixed near base, shorter dorsifixed. *Staminodes* 10, ligulate, connate in a whorl around base of ovary. Ovary hairy, ovules 4-6. Stigma capitate. Pod woody, dehiscent, oblong, flattened, septate. Seeds transverse in pod, smooth, oblong to suborbicular,  $\pm$  carunculate, hilum linear.

A pantropical genus of c. 100 species. Four species occur in Australia with 2 in the NT and DR. The long stiff hairs on the calyx and pod may cause irritation to the skin.

1. Stems trailing on ground; leaves densely hairy below;  
pods <20 mm wide, without wings ..... **M. reptans**
1. Stems climbing; leaves glabrate; pods >20 mm wide, 4-winged ..... **M. gigantea**

**M. gigantea (Willd.) DC.**

Twining, deciduous, woody vine. Stems, pulvini,

lower leaf surface and petiolules with scattered long stiff simple hairs. *Stipules* lanceolate, c. 3 mm long.

*Leaf* rachis to basal leaflets 31-105 mm, 41-130 mm overall; stipels setulose, c. 2 mm long; *leaflets* 67-140 mm long, 33-78 mm wide, L/W 1.6-2.7, base rounded, apex acute to acuminate. *Inflorescence* umbelliform, to 320 mm long. Pedicels 18-35 mm long, flattened, slender; bracteoles subtending and enclosing bud, lanceolate-ovate, 9-11 mm long. Rachis, peduncles and pedicels densely covered with short simple hairs; bracteoles, calyx and pod densely covered with short simple hairs and ferruginous long, stout, irritant hairs. *Calyx* cupular, 8.5-13 mm long; lobes 4-5, subequal, 3-4 mm long; tube c. 9 mm long. *Corolla* white or cream to pale green, with scattered long stiff simple hairs, petals shortly clawed; standard oblanceolate, 20-27 mm long; wings 30-35 mm long, convoluted in lower half, basal lobe prominent, thickened; keel straight, c. 43 mm long, adhering strongly and minutely fringed along both margins, lobed. *Staminal* filaments alternately long and short, free parts stout; short anthers bearded. *Ovules* 4-5; style incurved; hairy at base, slightly thickened towards apex. *Pod* brown to almost black, shortly stipitate, 85-150 mm long, 37-57 mm wide, ultimately dehiscent, winged along margins. *Seeds* 2-5, brown or mottled grey-brown, 18-23 mm diam.; ecarunculate, hilum extending 3/4 way around outer margin. *Flowering*: Feb - Oct; *fruiting*: Apr - Dec. Fig. 27

Found through the Old World tropics including India, China, Malasia and Polynesia. Widespread in tropical Australia, extending as far south as the north coast of NSW. Grows in the canopies of coastal vine forests and occasionally inland.

### **M. reptans** Verde.

A prostrate *vine* with annual aerial parts. All parts except corolla and pod with a dense indumentum of adpressed white simple hairs, sparse on the upper leaf surface; ferruginous long stout irritant hairs dense on pod, scattered on calyx. *Leaf* rachis to basal leaflets 75-183 mm, 88-215 mm overall; stipels filiform, 3-4 mm long; *leaflets* 80-120 mm long, 44-83 mm wide, L/W 1.1-1.9, base rounded, apex obtuse, mucronate. *Inflorescence* racemose, of 5-8 flowers, to 300 mm long. Pedicels 5-9 mm long. *Calyx* 5-12 mm long; lobes 4, subequal, upper emarginate, 6-7 mm long; tube 6-7 mm long. *Corolla* white-yellow, pale green, dark red or purple and white; standard not clawed, ovate, 30-36 mm long; wings not clawed, 45-60 mm long, adhering by lamellate patches on basal lobes; keel incurved, 55-70 mm long, upper margins adhering and fringed with fine hairs, lower margins connate. *Staminal* filaments equal, alternately thin with long anthers and thick with short anthers, filaments of the latter dilated towards apex; anthers glabrous. *Ovules* c. 6; style hairy in lower 2/3. *Pod* red-brown, straight or falcate, 60-95 mm long, 12-14 mm wide, margins not winged. *Seeds* 3-6, red-brown, 9-10 mm long, 7-9 mm wide; caruncle c. 8 mm long, flattened, eccentric; hilum obscured by caruncle. *Flowering*: Jan - Apr; *fruiting*: Apr. Fig. 27

Occurs in the Kimberley Region and western Top End, usually on fine textured soils in savanna. In the DR, found only between Batchelor and the Daly R.

## **PONGAMIA** Vent.

A genus of 2 species occurring in tropical Asia and the Pacific. One species occurs in Australia, in the NT and Qld.

### **P. pinnata** (L.) Pierre

A deciduous *tree* to 10 m, sometimes taller, flowering with the flush of new leaves; bark mostly smooth, grey. Stems and leaves glabrous or sparsely rusty hairy with simple hairs. *Stipules* caducous. *Leaves* imparipinnate; rachis to basal leaflets 15-47 mm, 67-130 mm overall; stipels absent; *leaflets* in 2-3 pairs, elliptic, ovate or rarely obovate, 55-125 mm long, 35-94 mm wide, L/W 1.3-1.9; base rounded, apex obtuse or shortly acuminate. *Inflorescence* of axillary racemes, to 160 mm long, flowers solitary or in 2's or 3's; rusty-hairy throughout (including all parts of corolla); bracts minute. Pedicels

3-6 mm long; bracteoles minute, persistent, just below the calyx. *Calyx* brown, cupular, c. 3 mm long; scarcely lobed. *Corolla* pale pink-mauve or white, petals clawed; standard  $\pm$  broad as long, c. 10 mm long, with infolded basal auricles, apex strongly emarginate; keel petals joined in midsection. Stamens 9+1; filaments alternately long and short; anthers uniform, dorsifixed and versatile. *Ovary* densely rusty-hairy; ovules 2; style glabrous above, curved; stigma minute. *Pod* brown, elliptic or  $\pm$  dimidiate and slightly curved, 30-55 mm long, 15-25 mm wide, woody, indehiscent, glabrous. *Seeds* 1-2, light to dark brown, elliptic, c. 18 mm long, 11 mm wide;

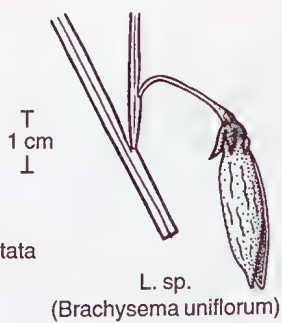


# Jacksonia



*J. dilatata*

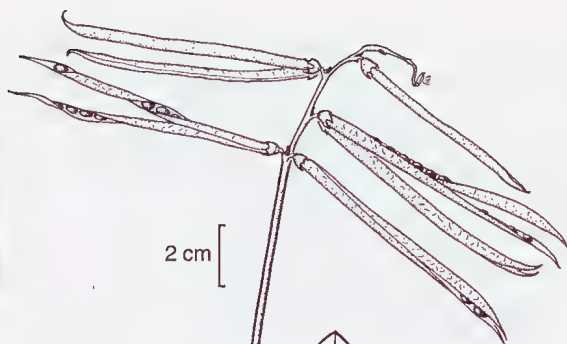
# Leptosema



*L. sp.*

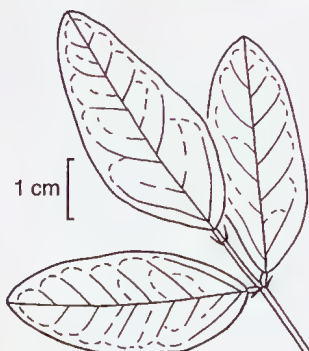
(*Brachysema uniflorum*)

# Macroptilium

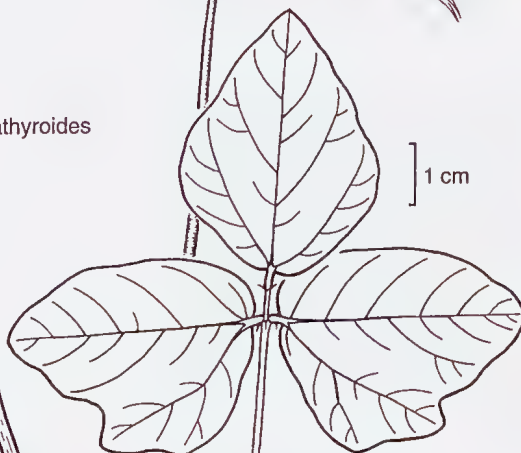


*M. lathyroides*

*M. lathyroides*



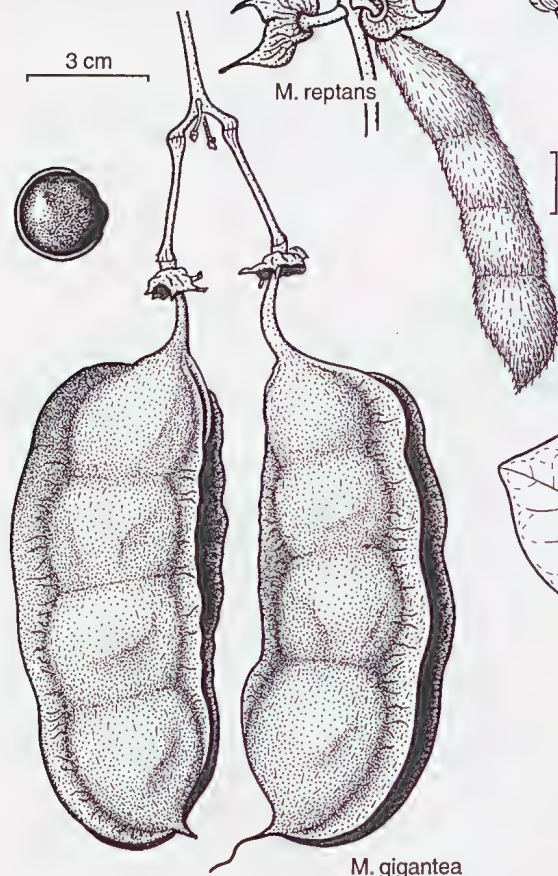
1 cm



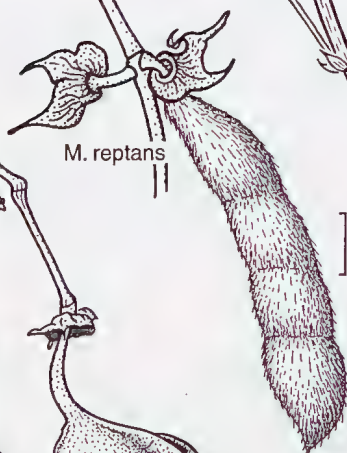
*M. atropurpureum*

1 cm

# Mucuna



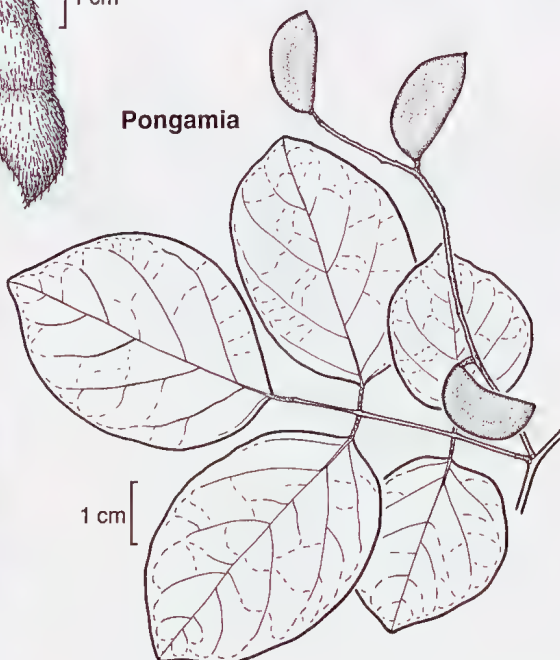
*M. gigantea*



*M. reptans*

1 cm

# Pongamia



*P. pinnata*

1 cm

hilum central. *Flowering*: Sept - Oct; fruiting: most months. Fig. 27

Range as for the genus. Relatively common in the

DR in coastal habitats including strand, edges of the mangroves and monsoon thickets; also river levees.

Cultivated in Darwin as a shade tree.

## PSORALEA L.

Evergreen perennial shrubs or annual herbs. Stipules persistent. Stipels absent. Inflorescence usually racemose, axillary or terminal; bracts persistent, bracteoles absent. Calyx 5-lobed. Corolla mauve, glabrous; standard obovate, auricles absent; wings and keel clawed. Stamens 9+1; anthers uniform, fixed near base, versatile. Ovary sessile or shortly stipitate, ovule 1; style incurved, glabrous, dilated in upper half; stigma capitate. Pod  $\pm$  ellipsoid, flat, indehiscent, pericarp adhering closely to seed. Seed ecarunculate, hilum eccentric.

A cosmopolitan genus of c. 120 species with 23 species in Australia and 14 species in the NT. Two widespread species occur in the DR.

- |                                                        |                    |
|--------------------------------------------------------|--------------------|
| 1. Leaves 1-foliolate; inflorescence crowded .....     | <b>P. badocana</b> |
| 1. Leaves 3-foliolate; inflorescence interrupted ..... | <b>P. cinerea</b>  |

### **P. badocana** (Blanco) Blanco

An erect *shrub* to 2.5 m tall. Vegetative and floral parts (including pods but excepting corolla) sparsely to densely covered with soft white long simple hairs, often crisped on stems. Upper surface of leaf densely covered with dark punctate glands which are sparse to absent elsewhere. *Stipules*  $\pm$  shortly connate at base, lanceolate, 6-15 mm long. *Leaves* 1-foliolate, rachis 5-26 mm long; *blade* discolorous, narrowly elliptic, ovate or lanceolate, 43-118 mm long, 20-47 mm wide, L/W 1.6-3.3, base rounded or cuneate, margin entire, apex obtuse to acute. *Inflorescence* crowded, to 40 mm long; bracts variable, ovate to lanceolate, obovate or oblong, 3-6 mm long, striate,  $\pm$  densely covered with red-brown depressed vesicular glands. Pedicels 2-5 mm long. *Calyx* 10-20 mm long; lobes unequal, lower lobe 4-8 mm longer than others; tube 2-4 mm long. *Standard* shortly clawed, 9-10 mm long, emarginate; wings lacking lamellae, lobed; keel straight, lower margin adhering in upper 1/3. Upper *stamen* adhering to sheath in lower half, geniculate at base. *Ovary* shortly stipitate, hairy. *Pod* dark brown, ellipsoid, flattened, c. 4 mm long, 2.5-3 mm wide. *Seed* brown. *Flowering*: Jan - Aug; fruiting: May - June. Fig. 28

Widespread in northern Australia, also in New Guinea, eastern Indonesia and the Philippines. Relatively uncommon in the DR. Grows on well drained soils in open habitats.

### **P. cinerea** Lindl.

An aromatic, usually erect, annual *herb* to 60 cm tall, rarely higher. Vegetative and floral parts (including pods but excepting corolla) sparsely to densely covered with adpressed white or grey simple hairs and reddish to black punctate glands. *Stipules* decurrent with rachis at base, ovate, 3-6 mm long, 1-3-nerved, attenuate. *Leaves* pinnately 3-foliolate, rachis to basal leaflets 13-60 mm, 20-77 mm overall; *leaflets* lanceolate, ovate or broadly ovate, 8-52(74) mm long, 6-30(46) mm wide, L/W 1.1-2.3, base cuneate, margin irregularly dentate, apex obtuse to acute. *Inflorescence* racemose, rarely panicleate, to 280 mm long; flowers 2-3 per node, nodes well spaced in upper 1/2-2/3; bracts ovate, c. 2 mm long, acuminate. Pedicels 1-1.5 mm long. *Calyx* 2.5-4 mm long; lobes subequal, 0.5-1 times as long as tube; tube 1.5-2 mm long. *Standard* not clawed, reflexed, c. 4 mm long; wings obliquely lamellate, prominently lobed at base; keel straight, lower margins adhering toward apex. Upper *stamen* free or adhering to one side of sheath in lower 1/4. *Ovary* sessile or shortly stipitate, glandular. *Pod* white to dark brown, ellipsoid to reniform, flattened, 3-4 mm long, 1.8-2.5 mm wide, viscid or warty, often densely white hirsute. *Seed* brown or olivaceous. *Flowering* and fruiting: most months. Fig. 28

Found in all mainland states, usually in semi-arid regions on heavy clay soils. Rare in the DR, where it is known only from the Daly R. floodplain.



## PYCNOSPORA Wight & Arn.

One species in the tropics and subtropics of the Old World, widespread across northern Australia. Taxonomically close to *Desmodium*, differing mainly by the pod.

### *P. lutescens* (Poir.) Schindler

Erect or spreading perennial *shrub* with annual stems. Stems sparsely to densely hairy with simple white hairs. Stipules persistent, striate, attenuate, 6-10 mm long. *Leaves* pinnately 3-foliolate, 1-foliolate at base of plant, rachis to basal leaflets 5-15 mm, 9-20 mm overall; stipels persistent, filiform; *leaflets* dorsiventral, oblanceolate or obovate, (11)15-45 mm long, 6-25 mm wide, L/W 1.3-2.5(3); venation prominent below with 3° veins  $\pm$  scalariform; thinly hairy with simple and minute hooked hairs; base rounded, apex obtuse to emarginate; terminal leaflet usually larger than basals. *Inflorescence* racemose, mostly terminal and unbranched to 150 mm long, densely hairy (including calyx) with simple, yellow glandular based and hooked hairs. Bracts caducous, ovate, acuminate, striate, 6-7 mm long. Pedicels 2-4

mm long. *Calyx* 3-4 mm long; lobes 4, attenuate, 2/3-3/4 of total length, upper bifid. *Corolla* lilac, glabrous; standard not clawed, not reflexed, obovate, c. 6 mm long, without auricles; wings and keel clawed. *Stamens* 9+1, filaments alternately long and short; anthers uniform, fixed near base, versatile. *Ovary* hirsute, ovules c. 9; style incurved, glabrous, stigma capitate. *Pod* black when mature, dehiscent, coriaceous, oblong, inflated, 8-10 mm long, 4-5 mm wide, thinly hairy with patent simple, minute hooked and rarely glandular based hairs, venation prominent, transverse, reticulate. *Seeds* dark mottled, oblong, c. 4 mm long, 2 mm wide. *Flowering*: Jan - Apr; *fruiting*: Jan - June. Fig. 28

In Eucalypt savanna on lateritic, sandy, skeletal and rarely clay soils.

## RHYNCHOSIA Lour.

Slender twining or prostrate vines with annual stems and perennial roots. Various pubescent with simple and glandular based hairs; vesicular glands present on vegetative parts, especially leaf undersurface, calyx and back of standard. Stipules persistent; stipels setaceous, c. 1 mm long. *Leaves* pinnately 3-foliolate, leaflets discolorous with 2 prominent basal nerves, basal leaflets asymmetric. *Inflorescence* an axillary raceme with reflexed flowers well spaced on the upper half of the rachis; bracts caducous; bracteoles absent. *Calyx* 5-lobed, acuminate, unequal, the upper 2 fused. *Corolla* yellow or yellow with red or brown lines; standard orbicular or almost so, reflexed, auriculate, lacking calli, with vesicular glands and minute hairs on back especially towards the apex. *Stamens* 9+1, anthers uniform. *Ovary* 2-ovuled; style incurved above; stigma small, terminal. *Pod* falcate, flattened, 2-valved, dehiscent, slightly raised over the seeds, base attenuate, apex obtuse. *Seeds* longitudinal in pod, often mottled, subreniform, flattened; funicle decurrent on the inside margin of the pod; hilum lateral; caruncle minute.

A pantropical genus of c. 150 species. Four species occur in Australia with 2 in the NT and DR.

- |                                                                                   |                            |
|-----------------------------------------------------------------------------------|----------------------------|
| 1. Terminal leaflet acuminate; basal leaflets 1.3-1.8 times as long as wide ..... | <b><i>R. australis</i></b> |
| 1. Terminal leaflet obtuse; basal leaflets 0.9-1.1 times as long as wide .....    | <b><i>R. minima</i></b>    |

### *R. australis* Benth.

All parts glabrate except for the tomentose pedicel, calyx and fruit. Reddish vesicular glands mostly confined to the leaf undersurface, calyx and back of standard. *Stipules* narrowly triangular, 2-4 mm long. *Leaf* rachis to basal leaflets 12-42 mm, 20-55 mm overall; *leaflets* dark green, thin, ovate, base rounded, apex acuminate; basal leaflets 20-53 mm long, 11-34

mm wide, L/W 1.3-1.8; terminal leaflet 20-55 mm long, 15-45 mm wide, L/W 1-1.6. *Inflorescence* to 160 mm long; bracts narrowly triangular, c. 1.5 mm long. Pedicels c. 1 mm long. *Calyx* 4-6 mm long. *Corolla* yellow sometimes with maroon stripes; standard 6-8 mm long. *Pod* dark brown, c. 20 mm long, 5-6 mm wide, tomentose with short white hairs interspersed with long glandular based hairs, often

viscid. *Seeds* 2, mottled red-brown, c. 4 mm long, 3 mm wide. *Flowering*: Mar - Sept; *fruiting*: Apr - Sept. Fig. 28

Occurs in coastal areas of the Top End, growing on the margins of coastal monsoon thickets on well drained soils. Uncommon in the DR. *Rhynchosia australis* as here recognised is based on a syntype collected by Armstrong at Port Essington. This taxon appears to be distinct from *R. australis* described in the Flora of New South Wales (Gardner & James, 1991) and from *R. minima* var. *australis* in the Flora of South-eastern Queensland (Stanley, 1983).

### **R. minima (L.) DC.**

All vegetative parts, calyx and fruit sparsely to densely tomentose with short white hairs, on the fruit often interspersed with long glandular based hairs. Golden to reddish vesicular glands abundant. *Stipules* lanceolate to ovate, 2-3 mm long. *Leaf* rachis to basal leaflets 4-66 mm, 6-78 mm overall; stipels c. 1 mm

long; *leaflets* coriaceous, base cuneate or rounded, apex rounded to slightly emarginate; basal leaflets ovate to broadly lanceolate, 10-39 mm long, 7-30 mm wide, L/W 0.9-1.1; terminal leaflet rhomboidal to suborbicular, 9-38 mm long, 9-40 mm wide, L/W 0.8-1.2. *Inflorescence* 25-125 mm long; bracts narrowly triangular, c. 2.5 mm long. Pedicels c. 2 mm long. *Calyx* 3-8 mm long. *Corolla* yellow; standard 6-9 mm long. *Pod* dark brown or olivaceous, 12-19 mm long, 4.5-6 mm wide. *Seeds* (1)2, mottled red-brown, 2.8-4.5 mm long, 2.5-4 mm wide. *Flowering*: Jan - June; *fruiting*: Mar - Aug. Fig. 28

Pantropical. Throughout tropical Australia and as far south as central NSW and inland SA. Grows on a variety of soils in open situations and in the DR is relatively common on rocky slopes. The description includes material from drier areas where leaflet dimensions are smaller than is normal for the DR. Plants with short fine and long tubercular based hairs on the pod can be referred to var. *eurycarpa* Domin.

## **SESBANIA Scop.**

Trees or annual or short-lived perennial shrubs. Stems of most species producing adventitious roots in standing water. Usually glabrate, or with simple hairs. Stipules caducous, rarely persistent. Leaves paripinnate with numerous pairs of leaflets, the rachis terminated by a bristle; stipels minute, setaceous; leaflets opposite, subopposite to alternate, usually oblong. Inflorescence an axillary raceme; bracts and bracteoles caducous. Calyx cupular, equally 5-lobed or toothed, glabrous without, the lobes often hairy within. Corolla glabrous; standard broad, often with conspicuous calli; wings and keel long-clawed, wing petals lamellate (except *S. formosa*). Ovary sessile or stipitate, glabrous; ovules numerous. Pod dehiscent, coriaceous to sub-woody, seeds lying longitudinally; hilum eccentric; ecarunculate.

A pantropical genus of c. 50 species with 10 species in Australia, 9 in the NT and 5 in the DR. Fast growing, soft-wooded trees and shrubs utilised for wood, fibre and green manure in some parts of the world (National Academy of Sciences, 1979; Turnbull, 1986). A red-flowered form of the Asian *S. grandiflora* (L.) Poir. is cultivated in Darwin. The flowers of this and some other species are eaten in Asia. [Burbidge, 1965]

- |                                                                                                                                         |                         |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1. Trees to 12 m high; standard >70 mm long .....                                                                                       | <b>S. formosa</b>       |
| 1. Shrubs to 4 m high; standard <25 mm long .....                                                                                       | <b>2</b>                |
| 2. Flower white, mauve or bluish .....                                                                                                  | <b>S. erubescens</b>    |
| 2. Flower yellow, often streaked or spotted with purple .....                                                                           | <b>3</b>                |
| 3. Standard >19 mm long .....                                                                                                           | <b>S. sesban</b>        |
| 3. Standard <16 mm long .....                                                                                                           | <b>4</b>                |
| 4. Standard 9-12 mm long; sinuses of calyx with 1-3 minute, linear appendages;<br>veins of keel petals scarcely divided at margin ..... | <b>S. cannabina</b>     |
| 4. Standard 12-15 mm long; calyx sinuses without appendages;<br>veins of keel petals much divided at margin .....                       | <b>† S. benthamiana</b> |

† One doubtful record in the DR; not treated further.



**S. cannabina** (Retz.) Pers.

Annual *shrub* to 2.5 m high. Stipules caducous, c. 5 mm long. *Leaf* rachis 40-250(350) mm long; stipels persistent; *leaflets* in 5-36 pairs, discolorous, narrowly oblong, 8-29 mm long, 2-5.5 mm wide, L/W 3-6.3, mucronate. *Inflorescence* 16-80 mm long, 2-9-flowered. Pedicels 3.5-8 mm long; bracteoles just below apex. *Calyx* 3-6 mm long, lobes c. 1/4 of total length, with 1-3 minute, peg-like appendages in the sinuses; sparingly hairy inside lobes. *Standard* yellow, usually densely streaked or spotted with purple, 9-12 mm long,  $\pm$  orbicular, calli raised along their length, the apices decurrent. Veins on keel margin scarcely divided. *Pod* sessile, (120)170-240 mm long, 2-4 mm wide. *Seeds* 23-40, brown or olivaceous, flattened-oblong, 3-3.2 mm long, 1.6-2 mm wide. *Flowering* and fruiting: most months. Fig. 28

Widespread in the Old World and in all mainland Australian states except Vic. In the NT, mostly on seasonally flooded clay soils. Forms associated with brackish habitats are often stunted and have shorter leaves and inflorescences.

**S. erubescens** (Benth.) N.T.Burb.

Annual or short-lived perennial *shrub* to 3 m high. *Leaf* rachis 70-160 mm long; *leaflets* in 11-25 pairs, 6-19 mm long, 1.5-4 mm wide, L/W 4-6.6. *Inflorescence* to 130 mm long, 6-13-flowered. Pedicels 6-11 mm long. *Calyx* 5-6 mm long, lobes c. 1/5 of total length. *Corolla* white to mauve; standard reflexed at calli, (14)17-20 mm long, calli points free, 1-1.5 mm long, obtuse; veins of keel petals much divided at margin. *Pod* stipitate, c. 220 mm long, 3.5 mm wide. *Seeds* 23-40, olivaceous, mottled, c. 4 mm long, 2.2 mm wide. *Flowering* and fruiting: Mar - May. Fig. 28

Australian endemic, in WA, NT and Qld. In the DR known only from the Daly R. floodplain, on heavy clay soils on seasonally flooded sites.

**S. formosa** (F.Muell.) N.T.Burb.

Evergreen *trees* to 15 m high, probably short lived;

bark pale, corky, fissured. Young parts finely sericeous, often ferruginous, becoming glabrous. Stipules caducous, 6-8 mm long, margins thin, undulate. *Leaf* rachis to 370 mm long; stipels caducous; *leaflets* in (8)14-20 pairs, 19-55 mm long, 6-17 mm wide, L/W 2.5-3.9, apex mucronate. *Inflorescence* to 170 mm long. Pedicels to 35 mm long; bracteoles c. 2/3 along pedicel. *Calyx* 17-25 mm long; lobes broadly triangular, 1/10-1/4 of total length, velutinous inside. *Corolla* white; standard clawed, elliptic, folded into auricles at the base, 70-100 mm long. *Pod* pendulous, to 450 mm long. *Seeds* 23-53, brown or black, subcylindrical, 5.5-8 mm long, c. 3 mm wide. *Flowering*: Mar - Sept; fruiting: Aug - Sept. Fig. 28

An Australian endemic. In perennially moist habitats from the Kimberley to north Qld. Infrequent in the DR region. Occasionally cultivated; a fast growing species that has been trialled for pulp production. This species has been confused with the closely related Asian species, *S. grandiflora*.

**S. sesban** (L.) Merr.

Annual or short-lived perennial *shrub* to 2 m. Stipules 5-6 mm long. *Leaf* rachis 70-130 mm long; stipels persistent; *leaflets* in (5)10-17 pairs, discolorous, narrow-oblong or oblong-lanceolate, 11-28 mm long, 1.8-7 mm wide, L/W 3.5-6.3. *Inflorescence* to 105 mm long, 4-8-flowered. Pedicels 9-11 mm long; bracteoles just below apex. *Calyx* 6-8 mm long, lobes c. 1/4 total length. *Corolla* yellow, standard lightly speckled; standard 19-22 mm long, calli prominently raised along their length, decurrent with claw, apices free; veins on keel undivided or a few once forked at margin. *Pod* flattened, slightly twisted, to 230 mm long, 3.2-4 mm wide. *Seeds* 43-48, olivaceous or brown, 3.2-4 mm long, 1.5-2.5 mm wide. *Flowering* and fruiting: Mar - May. Fig. 28

Widespread in the Old World tropics; in Australia in the NT and Qld. In the DR it is known from clay soils of the floodplains of the Adelaide, Finnis and Reynolds Rs.

## SMITHIA Aiton

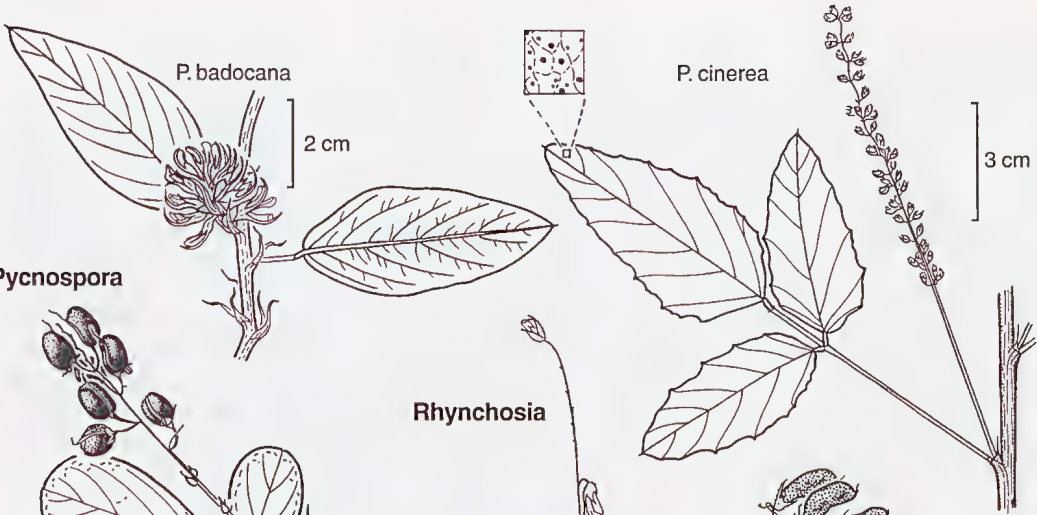
A genus of c. 30 species occurring throughout the Old World tropics, but primarily in Asia and Madagascar. Two species occur in northern Australia with 1 in the NT and DR. [Reynolds, 1990]

**S. conferta** Sm.

An erect annual or perennial *shrub* with  $\pm$  perennial

rootstock, to 1 m tall. *Leaf* rachis, leaflet margin, lower midrib, bracteoles and calyx hirsute with cream

**Psoralea**



**Pycnospora**



**Sesbania**

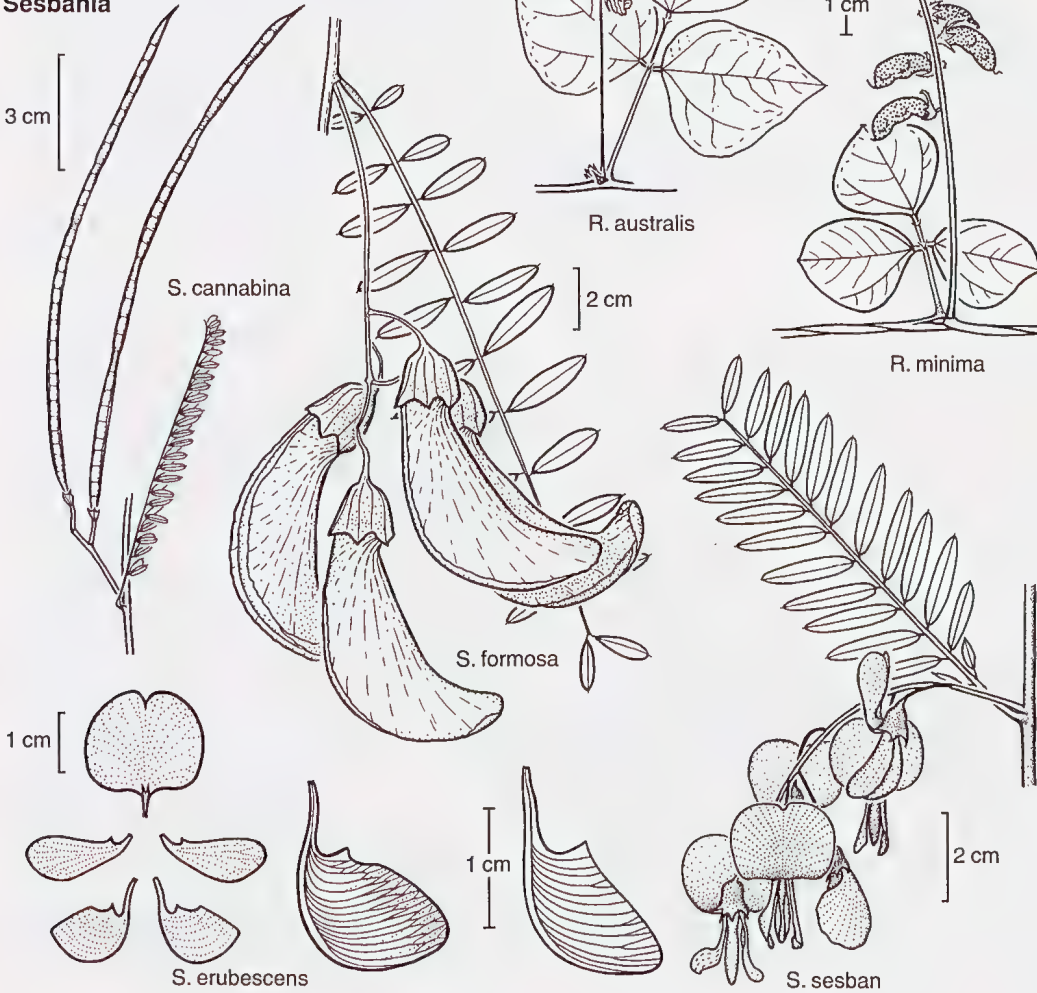


Fig. 28



coloured, tubercular based bristles to 2.5 mm long. Internodes long except at distal ends of stems where the leaves are clustered. *Stipules* persistent, produced almost equally above and below the point of attachment, brown, 14-16 mm long, membranous, striate. *Leaves* alternate, paripinnate, sensitive to touch; rachis to basal leaflets 1-3 mm, 11-25 mm long overall including terminal bristle; stipels absent; *leaflets* in 4-8 pairs, discolorous, oblong, 7-12 mm long, 2-3 mm wide, L/W 3.3-4.8, dotted with punctulate glands, base oblique, apex acute. *Flowers* in congested terminal fascicles of 1-4 flowers, enclosed in upper leaves; bracts persistent, brown, membranous, striate, ovate, long acuminate, 5-6 mm long. Pedicels c. 1 mm long; bracteoles similar to

bracts. *Calyx* 7-10 mm long; deeply 2-lipped, obscurely lobed, eventually enclosing the fruit, upper lip almost glabrous. *Corolla* yellow; standard 8-10 mm long, straight, glabrous; wings transversely lamellate. *Pod* articulated, pale brown, mottled, moniliform, concertina'd, c. 5 mm long; articles 3-6, globular, inflated, thin walled, indehiscent, tuberculate, glabrous. *Seeds* pale brown, subglobular, c. 1 mm long, 1 mm wide; hilum eccentric, minute; ecarunculate. *Flowering*: Mar - June; *fruiting*: Apr - June. Fig. 29

Occurs from India to tropical Qld and the NT, typically on the margins of floodplains and habitats which are moist into the dry season. In the DR, known only from the Adelaide R.

## SOPHORA L.

Trees or shrubs with a tomentum of simple hairs. *Stipules* present or absent. *Leaves* imparipinnate with many leaflets. *Stipels* absent. *Inflorescence* of many-flowered racemes. *Bracteoles* absent. *Floral whorls* joined at the base into a short tube, encircling but free from the ovary. *Calyx* cupular, shallowly 5-lobed. *Corolla* glabrous; standard spatulate; wings and keel petals long-clawed; wings narrow, lamellate; keel petals overlapping and adhering at apex. *Stamens* 10, free, arising from rim of the floral tube; filaments dilated at base. *Ovary* shortly stipitate, appressed-hairy, few- to many-ovuled. *Pod* indehiscent (in NT spp.), moniliform. *Seeds* globose or ellipsoid; hilum eccentric; ecarunculate.

About 50 spp. worldwide with 5 species in Australia (Qld, NSW, NT), 2 in the NT and 1 in the DR. Both NT species are treated here.

- |                                                  |                     |
|--------------------------------------------------|---------------------|
| 1. Plant densely tomentose; flowers yellow ..... | <b>S. tomentosa</b> |
| 1. Plant glabrate; flowers mauve or purple ..... | <b>S. longipes</b>  |

### **S. longipes** Merr.

Perennial *shrub* to 1 m high, often with annual aerial parts. Glabrate, hairs hyaline. *Stipules* minute, ± persistent. *Leaf* rachis to 300 mm long; *leaflets* in 5-8 pairs, discolorous, elliptic, ovate or obovate, 34-69 mm long, 15-37 mm wide, L/W 1.3-2.2. *Inflorescence* axillary and terminal, to 390 mm long; bracts minute, setaceous. *Pedicels* 6-9 mm long. *Calyx* 5-7.5 mm long, lobes c. 1/4 of total length. *Corolla* mauve or purple, wings lobed each side at base. *Ovules* 6-9. *Pod* 80-105 mm long, 4.5-7 mm wide. *Seeds* 1-4, pale brown, ellipsoid, c. 7 mm long, 5 mm wide. *Flowering* and *fruiting*: Mar - Oct. Fig. 29

Known from SE Asia to the Top End of the NT. In the DR found along the Adelaide R. in gallery forest.

### **S. tomentosa** L.

Evergreen *shrub* or small tree to 3.5 m high. All parts except corolla white-tomentose. *Stipules* absent. *Leaf* rachis to 250 mm long; *leaflets* in 6-10 pairs, discolorous, elliptic, ovate or oblong, often slightly asymmetric, 20-48 mm long, 12-29 mm wide, L/W 1.3-2.5. *Inflorescence* terminal, to 450 mm long; bracts linear, caducous, 2-4 mm long. *Pedicels* 5-8 mm long. *Calyx* 4-6 mm long, lobes minute. *Corolla* yellow; standard c. 18 mm long. *Ovules* c. 11. *Pod* persistent, 70-160 mm long, c. 10 mm wide. *Seeds* 1-9, brown, globose, 7-8 mm diam. *Flowering*: Feb - Jun; *fruiting*: all months. Fig. 29

Warm regions of the Old World; in Australia in the NT and Qld; not in the DR. In coastal habitats such as sand dunes and mangrove fringes.

## STYLOSANTHES Sw.

Herbs or subshrubs. Stipules adnate to lower part of petiole and sheathing the stem, 2-lobed, lobes aristate, leaf arising from the sinus. Leaves pinnately 3-foliolate. Inflorescences axillary or terminal, sessile, spicate or appearing capitate, 1-many-flowered, of 1-flowered spikes in axils of primary bracts (lowermost in the axil of primary leaf); outer bracts sheathing, highly imbricate, stipule-like, 1-3-foliolate; inner bracts ovate, 2-3-fid, hyaline, ciliate, persistent. Flowers sessile, each accompanied by a 2° bract and 1-2 hyaline, linear, ciliate bracteoles and sometimes by a plumose filiform axis rudiment. Calyx tube long, filiform, pedicel-like; lobes 5, membranous, ciliate, united at base, upper 4 connate for c. 1/2 their length, obtuse, lower lobe free, narrow, acute. Petals and stamens inserted in throat of calyx. Standard obovate or suborbicular, emarginate, shortly clawed; wings and keel laterally spurred, pouched; keel incurved. Stamens 5+5, anthers dimorphic, alternately long and basifixed, and short and versatile. Ovary subsessile, 2(3)-ovuled; style curved, filiform, persisting on fruit, stigma minute. Pod sessile, articulated, lower article often abortive, upper article ± obloid, laterally compressed, keeled, venation reticulate, apex beaked, often hooked. Seeds ovoid or ellipsoid, compressed.

A genus of c. 25 species, mostly in South America. Several species have been introduced to Australia for pasture improvement and 5 are now naturalised. These 5 are cultivated in the NT and are treated here. Only two species have become well established members of the flora in the DR, viz. *S. humilis* and *S. hamata*. The generic description is taken from Reynolds (1990).

|    |                                                                                                        |                      |
|----|--------------------------------------------------------------------------------------------------------|----------------------|
| 1. | Stylar hook on pod ≥4 mm long .....                                                                    | 2                    |
| 1. | Stylar hook on pod absent or <2 mm long .....                                                          | 3                    |
| 2. | Stipules bristly .....                                                                                 | <i>S. humilis</i>    |
| 2. | Stipules glabrous or almost so .....                                                                   | <i>S. hamata</i>     |
| 3. | Terminal segment of leaf rachis <1 mm long, leaves appearing digitate;<br>leaflets to 40 mm long ..... | <i>S. guianensis</i> |
| 3. | Terminal segment of leaf rachis >1 mm long; leaflets to 17 mm long .....                               | 4                    |
| 4. | Stylar hook 1.5-2 mm long; pod with long hairs .....                                                   | <i>S. scabra</i>     |
| 4. | Stylar hook <1 mm long; pod with short papillose hairs .....                                           | <i>S. viscosa</i>    |

### \**S. guianensis* (Aublet) Sw.

Semiprostrate, short lived perennial to 50 cm high. Vegetative parts pubescent with soft patent hairs and glandular yellow or red bristles. *Stipules* to 15 mm long. *Leaves* appearing digitately 3-foliolate with a terminal segment <1 mm long; rachis 3-8 mm long; *leaflets* narrowly elliptic, 14-40 mm long, 4-9 mm wide, L/W 2.9-6.6, the 3° venation below often resinous. *Flowers* 5-10 mm long. *Pod* 1-articled, 3.5-3.8 mm long, smooth, glabrous, thin walled with obscure venation; residual style <1 mm long. *Seed* pale brown. *Flowering* and fruiting: May - July. Fig. 29

#### Stylo

In Australia in WA, Qld and NT. Uncommon in the NT and DR, on disturbed sites.

### \**S. hamata* (L.) Taub.

Short lived decumbent perennial to 50 cm high. Stems with a band of patent fine hyaline hairs on one side, otherwise glabrous. *Stipules* to 17 mm long, mostly glabrous. *Rachis* to basal leaflets 3-6 mm, 5-10 mm overall; *leaflets* narrowly elliptic,

10-28 mm long, 2-5 mm wide, L/W 3.5-6.3. Bracts of the inflorescence ciliate. *Flowers* 7-10 mm long. *Pod* 1-2-articled, 3-6 mm long, articles 3-4 mm long, terminal stylar hook c. 4 mm long. *Seed* reddish brown. *Flowering* and fruiting: May - Nov. Fig. 29

#### Verano

In WA, Qld and in the NT in the Top End and DR. Common on disturbed sites around settlements.

### \**S. humilis* Kunth

Suffrutescent prostrate or erect annuals. Stems with a line of minute, glandular based curved hairs on one side; long, patent, tubercular based bristles on most parts, especially the stipules and floral bracts. *Stipules* to 10 mm long. *Leaflets* narrowly lanceolate or narrowly elliptic, 5-24 mm long, 1.8-5 mm wide, L/W 2.5-7.5. *Flowers* 5-8 mm long. *Pod* c. 3 mm long, terminal stylar hook 4-6 mm long, thinly sericeous. *Seed* yellow-brown. *Flowering* and fruiting: Apr - July. Fig. 29

#### Townsville Stylo (TS)



Widespread across tropical Australia. In disturbed areas and open habitats.

**\*S. scabra** Vogel

Annual or short lived perennial to 1 m high. Vegetative parts pubescent throughout with soft patent hairs, sparse glandular based hairs and stiff bristles. *Stipules* to 13 mm long. *Rachis* to basal leaflets c. 5 mm, 6.5-8 mm overall; *leaflets* elliptic or oblanceolate, 9-17 mm long, 3.5-8 mm wide, L/W 2.1-3.4, patchy red-resinous below. *Flowers* 9-11 mm long. *Pod* 1(2)-articled, 2.5-3.5 mm long, sericeous or hirsute, styler hook 1.5-2 mm long. *Flowering* and fruiting: Feb - July. Fig. 29

In WA, NT, Qld; in the NT known from Groote

Eylandt and Bullita. Grows along roadsides and in disturbed areas.

**\*S. viscosa** Sw.

Viscid perennial to 0.8 m high. Vegetative parts densely hairy with glandular based and short simple hairs. *Stipules* to 10 mm long. *Rachis* to basal leaflets 3-8 mm, 4-10 mm overall; *leaflets* elliptic or oblanceolate, 5-12 mm long, 2-5 mm wide, L/W 2-2.7, patchy red-resinous below. *Flowers* 5-8.5 mm long. *Pod* 1-articled, c. 2 mm long, white-papillose; styler hook minute. *Flowering* and fruiting: Jan - May. Fig. 29

In Australia known from the NT and Qld. Uncommon in the DR in disturbed areas.

## TEMPLETONIA R.Br.

An endemic Australian genus of c. 16 species represented in all mainland states; 2 in the NT, 1 in the Top End.

**T. hookeri** (F.Muell.) Benth.

Evergreen broom-like *shrub* to 3 m. *Stems* and foliage often yellow-green, indumentum (including calyx) usually sparse, of adpressed simple white minute hairs with tufts of reddish short glandular or resinous hairs in leaf axils. *Stipules* persistent, minute. *Leaves* 1-foliolate or pinnate with 1 or 2 pairs of leaflets or appearing digitately 3-foliolate through the shortening of the last internode of the rachis; stipels minute, persistent; rachis 22-70 mm long; *leaflets* similar to rachis, filiform, 10-60 mm long, apex a curved mucro. *Flowers* solitary in axils; peduncles 24-45 mm long. Pedicels 3-4 mm long; bracteoles at base of pedicels, persistent. *Calyx* 11-16 mm long; unequally 4-lobed, lobes 2-3 times longer than tube, upper lobe longer and narrower. *Corolla* yellow, glabrous; petals clawed; standard elliptic, 14-18 mm

long, emarginate; wings and keel petals lobed at base; wings lamellate; keel petals adnate in upper half. *Stamens* 10, dimorphic, in an open sided sheath; anthers alternately basifixed and dorsifixed just above base, all versatile. *Ovary* stipitate, glabrous; ovules c. 4; style glabrous; stigma terminal, minute. *Pod* stipitate, olivaceous or black, flattened, oblong to elliptic, 25-35 mm long, 10-11 mm wide with a mealy indumentum inside between the seeds, apex caudate. *Seeds* 2-5, transverse in pod, brown, flattened-obovoid, c. 6 mm long, 4.5 mm wide; hilum towards one end; caruncle prominent. *Flowering* and fruiting: all months. Fig. 29

Widespread across northern Australia north of 21° 30' S; not recorded from the DR. Usually on sandstone or quartzite in open habitats. The wood is used by Aborigines to make woomeras (Russell-Smith, 1985).

## TEPHROSIA Pers.

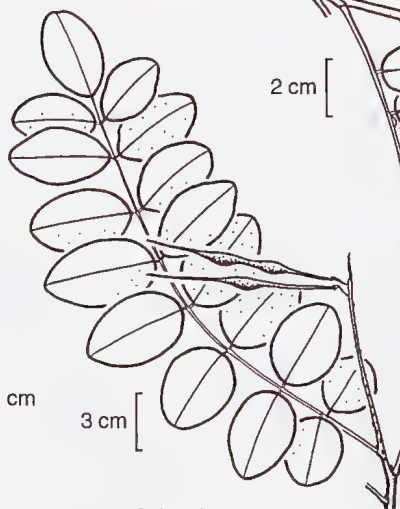
Evergreen shrubs or herbs, sometimes annual or short lived. Vegetative parts with a sparse to dense indumentum of basifixed hairs. *Stipules* usually persistent, stipels usually absent. *Leaves* usually imparipinnate, less commonly 1-foliolate or 3-foliolate; leaflets frequently with secondary veins straight (craspedodromous) or curving slightly upwards to the margin (eucamptodromous), the secondary and intersecondary veins numerous and parallel, the latter sometimes obscure, less often with secondary veins arching submarginally to the vein above (brochidodromous) and then with reticulate tertiary venation; often punctulate and usually glabrous

## Smithia

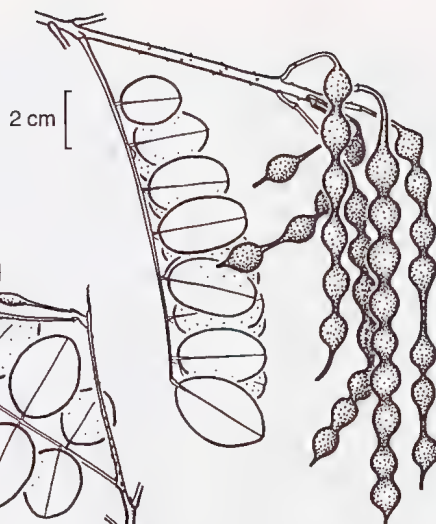


*S. conferta*

## Sophora



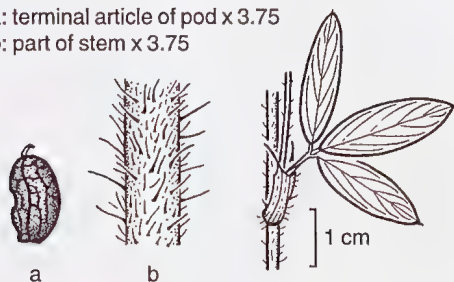
*S. longipes*



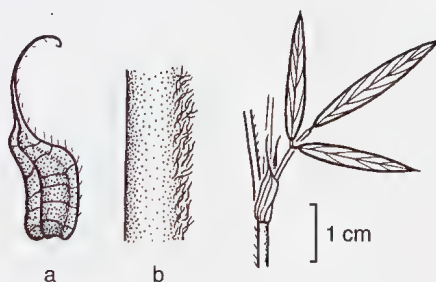
*S. tomentosa*

## Stylosanthes

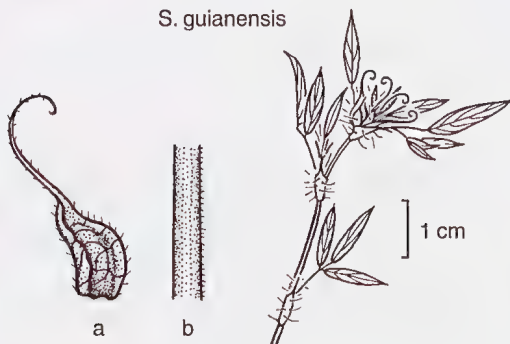
a: terminal article of pod x 3.75  
b: part of stem x 3.75



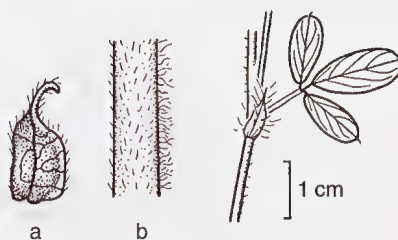
*S. guianensis*



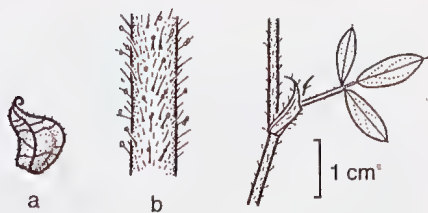
*S. hamata*



*S. humilis*

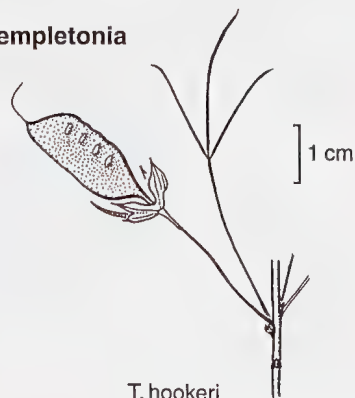


*S. scabra*



*S. viscosa*

## Templetonia



*T. hookeri*



above, with a small mucro. Inflorescence usually an interrupted terminal or axillary pseudoraceme, rarely of axillary fascicles or crowded pseudoracemes; bracts present; bracteoles absent. Calyx 5-lobed, lobes connate at base, usually subequal, the lower longest and the upper 2 sometimes more connate. Corolla white, red to purple, orange or yellow; petals clawed; standard nearly orbicular to reniform, reflexed, sericeous on back; wings obliquely ovate or oblong; keel incurved. Stamens 9+1; anthers uniform. Ovary sessile, usually with many ovules; style incurved or inflexed, often flattened, glabrous or hairy; stigma terminal, linear or capitate, penicillate or glabrous. Pod usually linear to oblong with 1-12 seeds, continuous within or with thin septa between the seeds; usually turgid at maturity, sometimes flattened, apex beaked with persistent style base which may be straight, bent upwards or deflexed and is usually in line with upper suture (marginal) but sometimes is between the sutures (central). Seeds longitudinal in pod, usually oblong or lenticular and elliptic in cross-section; usually ecarunculate.

A pantropical and subtropical genus of more than 400 species. About 80 species occur in Australia, with c. 40 in the NT and 16 in the DR. Species of the genus *Tephrosia* commonly contain the compounds deguelin, rotenone and tephrosin (Bosman & de Haas, 1983) and are widely used by Aborigines in the NT for poisoning fish (e.g. Wightman & Smith 1989).

- |                                                                                                                                    |                             |
|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 1. Leaflets >20 times longer than wide .....                                                                                       | 2                           |
| 1. Leaflets <20 times longer than wide .....                                                                                       | 4                           |
| 2. Inflorescences <60 mm long, few-flowered, rachis filiform .....                                                                 | <b>T. filipes</b>           |
| 2. Inflorescences >60 mm long, many-flowered, rachis slender but not filiform .....                                                | 3                           |
| 3. Leaflets 1(-3), linear .....                                                                                                    | <b>T. simplicifolia</b>     |
| 3. Leaflets >7, filiform .....                                                                                                     | <b>T. nematophylla</b>      |
| 4. Leaves simple or 1-3-foliolate and leaflets >3 mm wide .....                                                                    | 5                           |
| 4. Leaflets >6 <b>OR</b> if 1-3-foliolate then leaflets <3 mm wide .....                                                           | 7                           |
| 5. Flowers predominantly in axillary fascicles; leaves usually 1-foliolate .....                                                   | <b>T. coriacea</b>          |
| 5. Flowers predominantly in pseudoracemes; leaves simple or 3-foliolate .....                                                      | 6                           |
| 6. Stems and leaf undersurfaces usually sparsely adpressed hairy;<br>leaves usually simple .....                                   | <b>T. lamproloboides</b>    |
| 6. Stems and leaf undersurfaces densely white-sericeous; leaves 3-foliolate .....                                                  | <b>T. 'Hayes Ck'</b>        |
| 7. Terminal leaflet of well developed leaves 2-5 times as long as laterals;<br>slender annual .....                                | <b>T. juncea</b>            |
| 7. Terminal leaflet 1-1.5 times as long as laterals; perennials or bushy annuals .....                                             | 8                           |
| 8. More than 20 pairs of leaflets on well developed leaves .....                                                                   | <b>T. polyzyga</b>          |
| 8. Less than 20 pairs of leaflets on well developed leaves .....                                                                   | 9                           |
| 9. Leaflets usually >15 mm wide .....                                                                                              | <b>T. oblongata</b>         |
| 9. Leaflets <15 mm wide .....                                                                                                      | 10                          |
| 10. Inflorescence a crowded terminal pseudoraceme .....                                                                            | <b>T. phaeosperma</b>       |
| 10. Inflorescence an interrupted pseudoraceme or flowers in<br>axillary fascicles of 1-4 flowers .....                             | 11                          |
| 11. Flowers orange, rarely yellow .....                                                                                            | 12                          |
| 11. Flowers purple, mauve or magenta .....                                                                                         | 15                          |
| 12. Pods >5 mm wide; plants with several to many ellipsoidal root tubers;<br>stipules patent to recurved; seeds ecarunculate ..... | <b>T. porrecta</b>          |
| 12. Pods <5 mm wide; plants lacking root tubers ( $\pm$ a thickened tap root);<br>stipules erect; seeds $\pm$ carunculate .....    | 13                          |
| 13. Indumentum yellow-brown; seeds with a flattened, green caruncle .....                                                          | <b>T. 'Katherine Gorge'</b> |
| 13. Indumentum white or hyaline; seeds ecarunculate .....                                                                          | 14                          |

- |                                                                                                                                            |                        |
|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 14. Leaflets <4 mm wide, filiform to narrowly oblanceolate;<br>seeds 6-9 in pod; flowers in terminal and axillary pseudoracemes .....      | <b>T. subpectinata</b> |
| 14. Leaflets >4 mm wide, oblanceolate or elliptic; seeds 9-13 in pod;<br>flowers in axillary fascicles and/or terminal pseudoracemes ..... | <b>T. spechtii</b>     |
| 15. Inflorescences <60 mm long, few-flowered, rachis filiform .....                                                                        | <b>T. filipes</b>      |
| 15. Inflorescences usually >60 mm long, many-flowered, rachis<br>slender but not filiform .....                                            | <b>16</b>              |
| 16. Standard <6 mm long; pod <35 mm long; seeds <3 mm long .....                                                                           | <b>T. remotiflora</b>  |
| 16. Standard >6 mm long; pod >35 mm long; seeds >3 mm long .....                                                                           | <b>T. brachyodon</b>   |

**T. brachyodon** Domin var. **longifolia** (Benth.) Domin  
*T. purpurea* (L.) Pers. var. *longifolia* Benth.

An erect annual or short-lived perennial *shrub* 0.5-1.5 m tall. All parts with sparse adpressed white hairs, inflorescence parts sometimes sericeous. *Stipules* setaceous, 4-8 mm long. *Leaves* oblong in outline; rachis to basal leaflets 8-18(28) mm, 35-120(170) mm overall; *leaflets* in (2)5-7(11) pairs, discolorous, narrowly oblanceolate to very narrowly elliptic, 20-55(65) mm long, 2-8 mm wide, L/W 4-28, 2° veins closely spaced, numerous, c. 30 degrees to midrib, 3° veins  $\pm$  obscure, base cuneate, apex emarginate, obtuse or acute. *Inflorescences* leaf-opposed, racemose, 170-370(500) mm long, flowers 1-3 per node; bracts caducous, setaceous, 1-4 mm long. Pedicels 5-9 mm long. *Calyx* 2-5 mm long. *Corolla* purple or mauve; standard 6-9 mm long. *Pod* pale brown, linear, upcurved toward apex, turgid, 35-50 mm long, 3.5-4.5 mm wide, beak marginal, straight. *Seeds* 5-10, centres > pod width apart, weakly mottled, pale brown to olivaceous, subcylindrical to oblong, 3-5 mm long, 2-3 mm wide; caruncle <0.5 mm; hilum central. *Flowering*: Dec - Apr; fruiting: Mar - July. Fig. 30

A widespread, variable species occurring across tropical Australia, mostly south of 15° S. In the DR known only from Mt Bundey where it occurs on well drained coarse sandy soils derived from granite. Commonly on soils of coarse texture in a variety of habitats. Seeds of the DR form are subcylindrical and longer than those from the southern Gulf of Carpentaria.

**T. coriacea** Benth.

An erect perennial *shrub* to 1 m tall, often with annual above ground parts. All parts sparsely to densely sericeous with white or hyaline hairs, the leaves almost glabrous to thinly sericeous above, the pod sometimes tomentose. *Stipules* setaceous to filiform, 4-12 mm long. *Leaves* 1-foliolate, less often pinnately 3-foliolate; rachis to basal leaflets (4)17-31(42) mm, 4-72 mm overall; *leaflets* discolorous, elliptic, obovate or broadly ovate, 31-76 mm long,

11-41 mm wide, L/W 1.4-3.1, 2° veins c. 45 degrees to midrib, 3° veins reticulate, base rounded, apex obtuse or emarginate. *Inflorescences* axillary, fasciculate, rarely also terminal and racemose to 100 mm long, flowers 1-4 per node; bracts caducous, setaceous, c. 2 mm long. Pedicels 2-4 mm long. *Calyx* 4-5 mm long; lobes acute to acuminate. *Corolla* orange; standard 6-9 mm long. *Pod* stramineous, linear-oblong, curved toward apex, flattened, raised over seeds, 32-45 mm long, 5-6 mm wide, beak marginal, straight. *Seeds* 5-6, centres > pod width apart, mottled pale and dark brown and black, oblong, 3.5-4.5 mm long, 2.5-3.5 mm wide; caruncle small, white, annular. *Flowering*: Jan - Apr; fruiting: Mar - Apr. Fig. 30

Occurs in the Kimberley, VRD and western Top End on sandstone ridges and plateaus. Known in the DR from Litchfield NP and from sandstone hills south of Adelaide River. This species, *T. lamproloboides* and *T. "Hayes CK"* are closely related and specimens with intermediate characters sometimes occur.

**T. filipes** Benth.

An erect or prostrate annual or perennial *herb* to 50 cm tall. All parts with a sparse indumentum of adpressed white hairs, the leaves glabrous above. *Stipules* setaceous, c. 3 mm long. *Leaves* oblong in overall shape; rachis to basal leaflets 0.5-6 mm long, 1.5-30 mm overall; *leaflets* in 1-5(8) pairs, discolorous, narrowly lanceolate, narrowly elliptic, linear or filiform, 7-30(40) mm long, 1.3-2 mm wide, L/W 3.5-20(28), 2° veins red or green below, closely spaced, c. 15 degrees to midrib, 3° veins obscure, base narrowly cuneate, apex acute, mucro  $\pm$  oblique. *Inflorescences* leaf-opposed, racemose, unbranched, few flowered, to 60 mm long, flowers 1-2 per node, rachis filiform; bracts persistent; setaceous, c. 2 mm long. Pedicels c. 2 mm long. *Calyx* 2-3 mm long. *Corolla* mauve or pink; standard c. 6 mm long. *Pod* stramineous to pale brown, linear, slightly curved toward apex, turgid, 20-25 mm long, 3-3.5 mm wide, beak marginal, straight. *Seeds* 6-8, centres c. pod



width apart, pale brown with dark mottles, suborbicular to subcylindrical, 2-2.5 mm long, 1.5-2 mm wide; caruncle white, annular, c. 0.25 mm diam. *Flowering*: June; *fruiting*: Apr - June. Fig. 30

In Qld but relatively rare in the NT and in the DR known only from north east of Pine Creek. Occurs in Eucalypt savanna on a variety of soils. A second variety, var. *latifolia*, has broader leaflets.

**T. juncea** R.Br. ex Benth.

A slender, erect annual *shrub* to 1 m tall. All parts with adpressed white hairs, sometimes sericeous on inflorescence parts. *Stipules* setaceous to filiform, 4-8 mm long. *Leaves* linear to narrowly triangular in outline; rachis to basal leaflets 2-8 mm, 78-198 mm overall; *leaflets* in (6)16-36 pairs, discolorous, lateral leaflets narrowly elliptic or oblanceolate, (4)6-12 mm long, 1.5-3 mm wide, L/W 2.7-4, terminal leaflet linear or narrowly cuneate, 15-35 mm long, 1.3-5 mm wide, L/W 5-13.8, 2° veins closely spaced, c. 30 degrees to midrib, 3° veins obscure, base acute, apex retuse, truncate or obtuse. *Inflorescences* terminal and axillary, racemose, unbranched, to 380 mm long, flowers 1-2 per node; bracts persistent, setaceous, 1.5-2.5 mm long. Pedicels 3-4 mm long. *Calyx* 2-3 mm long, shallowly lobed, lobes broadly triangular. *Corolla* purple, mauve or pink; standard 5-6 mm long. *Pod* stramineous, linear, curved toward apex, turgid, 50-62 mm long, 3-4 mm wide, beak marginal, straight. *Seeds* 10-13, centres > pod width apart, mottled black, brown and white, subcylindrical to oblong, 3-4 mm long, 1.5-2 mm wide; ecarunculate. *Flowering*: Feb - June; *fruiting*: Mar - Sept. Fig. 30

Widespread in north Qld and the NT. Uncommon in the DR where it is found growing on sandy surfaced soils in *E. tetradonta* forest.

**T. lamproloboides** F.Muell.

A prostrate or erect perennial *subshrub* to 40 cm tall, with annual above ground parts. Vegetative parts sparsely adpressed hairy to densely sericeous with white hairs. *Stipules* green, triangular, 2-6 mm long, 1-2 mm wide, prominently veined. *Leaves* ground hugging or divergent, apparently simple; petioles 2-4 mm long; *blades* slightly discolorous, ± dorsiventral, narrowly elliptic, elliptic, narrowly ovate or ovate, 35-85 mm long, 10-65 mm wide, L/W 1.2-4(6), 2° veins c. 60 degrees to midrib, 3° veins reticulate, base rounded, apex obtuse or emarginate. Floral parts sericeous with white to golden hairs. *Inflorescences* terminal and leaf-opposed, racemose, 70-400 mm long, flowers 1-3 per node; floral bracts persistent, similar to stipules, c. 3 mm long. Pedicels 3-5 mm long. *Calyx* 4-5 mm long, shallowly lobed. *Corolla*

orange, gland dotted; standard 6-10 mm long. *Pod* pale brown, linear, ± straight, flattened, raised over seeds, 39-46 mm long, c. 5 mm wide, tomentose with white to hyaline hairs, margin slightly thickened, beak central, deflexed. *Seeds* c. 7, not seen. *Flowering*: July - Mar; *fruiting*: Jan. Fig. 30

Endemic to the western Top End and relatively common in the DR. Found in Eucalypt savanna on a variety of well drained soils.

**T. nematophylla** F.Muell.

An erect, perennial *shrub* to 1.2 m tall, often with annual above ground parts. Bark white, often corky and deeply furrowed, even on small plants. Vegetative and inflorescence parts with sparse adpressed to erect white hairs, sometimes dense on inflorescence. *Stipules* narrowly triangular to setaceous, 1-4(7) mm long. *Leaves* obovate in outline; rachis to basal leaflets 2-8 mm, 35-60(135) mm overall; *leaflets* in (3)5-9(20) pairs, filiform, canaliculate above (rarely linear and flattened in lower leaves), 20-63 mm long, c. 0.5 mm wide, L/W 40-120, veins obscure. *Inflorescences* terminal and sometimes also axillary or leaf-opposed, racemose, with 1-2 orders of branching, 170-280(450) mm long, flowers 1-3 per node; floral bracts persistent, 1-2 mm long. Pedicels 2.5-4.5 mm long. *Calyx* 2-3 mm long, shallowly lobed. *Corolla* yellow, rarely orange; standard 5-7.5 mm long. *Pod* dark grey, stiffly coriaceous, ± straight, flattened, raised over seeds, 32-35 mm long, 3.5-5 mm wide, ?tardily dehiscent, tomentose or rarely with adpressed hairs, margin thickened, beak central, straight. *Seeds* 5-9, centres > pod width apart, dull, olivaceous, oblong to orbicular, 2.2-3 mm long, 2-2.2 mm wide; ecarunculate. *Flowering*: June - Mar; *fruiting*: Nov - Mar. Fig. 30

Endemic to the Top End of the NT, having a fragmented distribution. Locally common in the Darwin rural area, also occurring near the Daly R. Grows on well drained soils on ridges and on sand. Forms from more southerly areas tend to have more leaflets.

**T. oblongata** R.Br. ex Benth.

An erect perennial *shrub* to 1.5 m tall. Most parts velutinous to sericeous with yellowish brown, rarely grey or white hairs, the leaflets usually hairy above. *Stipules* ± persistent, setaceous or narrowly triangular, 6-10 mm long. *Leaf* rachis to basal leaflets (6)15-25(40) mm, 20-150 mm overall; petiolule 2-4 mm; *leaflets* in (2)4-7(10) pairs, slightly discolorous, dorsiventral, elliptic, oblong, or broadly elliptic, rarely obovate or lanceolate, 25-95 mm long, 10-40 mm



wide, L/W 1.2-5.8, 2° veins 60-75 degrees to midrib, 3° venation reticulate, base obtuse, apex obtuse, occasionally truncate. *Inflorescences* terminal and axillary, racemose, usually unbranched, 75-360 mm long, flowers 1-4 per node, crowded; bracts  $\pm$  caducous, setaceous to narrowly triangular, (3)5-15 mm long. Pedicels 3-5 mm long. *Calyx* 6-10 mm long; lobes acuminate. *Corolla* orange, rarely yellow; standard 8-14 mm long. *Pod* yellowish brown, linear, slightly curved towards the apex, turgid, 51-70 mm long, 3.5-4 mm wide, densely velutinous with long and short hairs, beak marginal, straight or upturned. *Seeds* 8-12, separated by spongy septa, olivaceous or yellowish, oblong, oblong in cross-section, 2.8-3.2 mm long, c. 2 mm wide; caruncle green, flattened, asymmetric. *Flowering*: Dec - Mar; *fruiting*: Feb - July. Fig. 30

In the Kimberley and the NT in open but less fire prone habitats, usually on well drained sandy soils. Relatively common in the DR in rocky situations on sandstone or granite and on sandy lowlands. Forms from sandstone habitats can have fewer, smaller leaflets with more prominent venation and a denser indumentum.

**T. phaeosperma** F.Muell. ex Benth.

An erect annual or short-lived perennial *shrub* to 1.5 m tall. All parts with sparse adpressed white hairs to silvery sericeous or occasionally softly tomentose, the leaflets sometimes green and glabrous above. *Stipules* acicular, 3-5 mm long. *Leaves* obovate in outline; rachis to basal leaflets 2-5(10) mm, 8-47(85) mm overall; *leaflets* in 1-4(7) pairs,  $\pm$  discolorous, elliptic, oblanceolate or spatulate, 12-43(50) mm long, 3-15(18) mm wide, L/W 2.6-8, 2° veins (below) pale or reddish, closely spaced, 30-45 degrees to midrib, 3° veins  $\pm$  obscure, base attenuate or cuneate, apex retuse, truncate, acute or obtuse. *Inflorescences* terminal, racemose, to 60(120) mm long, flowers 1-3 per node, crowded; bracts persistent, setaceous, c. 1 mm long. Pedicels 3-4 mm long. *Calyx* 2-4 mm long. *Corolla* purple, mauve or pink; standard 5-8 mm long. *Pod* dark brown, oblong, straight, flattened, raised over seeds, 18-40 mm long, 4-6 mm wide, beak central, deflexed or straight. *Seeds* (3)5-8(10), oblique, centres < pod width apart, pale brown or olivaceous with darker mottles, globular-oblong, orbicular or reniform, 2.8-3.5 mm long, 2.2-3 mm wide; hilum central; caruncle white, annular, minute. *Flowering* and *fruiting*: Feb - Oct. Fig. 30

Widespread from the Gulf of Carpentaria to the Kimberley and most common in the lower latitudes of the monsoonal region. Rare in the DR where known only from the Tabletop Range in Litchfield NP.

Occurs on sandy soils, usually associated with sandstone. Forms from drier areas have fewer leaflets and are often silvery sericeous. Used as a fish poison (Smith *et al.*, 1993).

**T. polyzyga** F.Muell. ex Benth.

An erect perennial *shrub* to 1 m tall, with annual above ground parts. Vegetative parts with a sparse to dense indumentum of silver to white sericeous hairs, the leaves almost glabrous to tomentose above. *Stipules* caducous, setaceous, 2-5 (in one form 10-12) mm long. *Medial leaves* linear to narrowly lanceolate in outline; rachis to basal leaflets 0-8 mm, 70-270 mm overall; *leaflets* in (14)20-36(52) pairs, discolorous, narrowly elliptic to narrowly oblanceolate, less commonly linear, spatulate or cuneate, (2)6-28 mm long, 1-5 mm wide, L/W (3)5-7(10), 2° veins c. 45 degrees to midrib, 3° veins obscure, base attenuate or cuneate, apex acute, obtuse or emarginate. Floral parts with white to rusty sericeous hairs. *Inflorescences* terminal and axillary, racemose, with up to 3 orders of branching, 100-370(800) mm long, flowers 1-3 per node; bracts  $\pm$  persistent, setaceous, 1-3 mm long. Pedicels 3-7 mm long. *Calyx* 2-5 mm long, lobes acute to acuminate. *Corolla* yellow, yellow-green or orange; standard 5-8 mm long. *Pod* grey, pale or dark brown, oblong,  $\pm$  straight, flat, raised over seeds, 30-55 mm long, 5-6 mm wide, tomentose with grey to yellowish hairs, beak central, straight. *Seeds* 4-6, centres  $\geq$  pod width apart,  $\pm$  mottled, dark brown, oblong to square, elliptic in cross-section, 2.5-4 mm long, 2.5-4 mm wide; caruncle white, small, annular. *Flowering*: Oct - July; *fruiting*: Jan - June. Fig. 31

Found in northern WA, Qld and the NT. In the DR, occurs south and east of the Adelaide R. on ridges on well drained, rocky soils derived from fine grained sediments. *Tephrosia polyzyga* is a widespread, variable taxon. In the DR two forms are known, one sparsely hairy with shorter emarginate to acute leaflets and orange flowers, the other densely sericeous with longer acute leaflets and yellow flowers. These forms intergrade outside the DR.

**T. porrecta** R.Br. ex Benth.

*T. singuliflora* F.Muell.

A prostrate or erect multistemmed perennial *subshrub*, with annual above ground parts and many narrowly ellipsoid tubers to 60 mm long and 20 mm diam. on lateral roots. All parts with white or golden hairs, sparsely adpressed to pilose on vegetative parts, pilose on floral parts and pod. *Stipules* patent or recurved, green, triangular, 3-6 mm long, 0.5-2 mm wide, prominently veined. *Leaves* oblong to lanceolate

Tephrosia

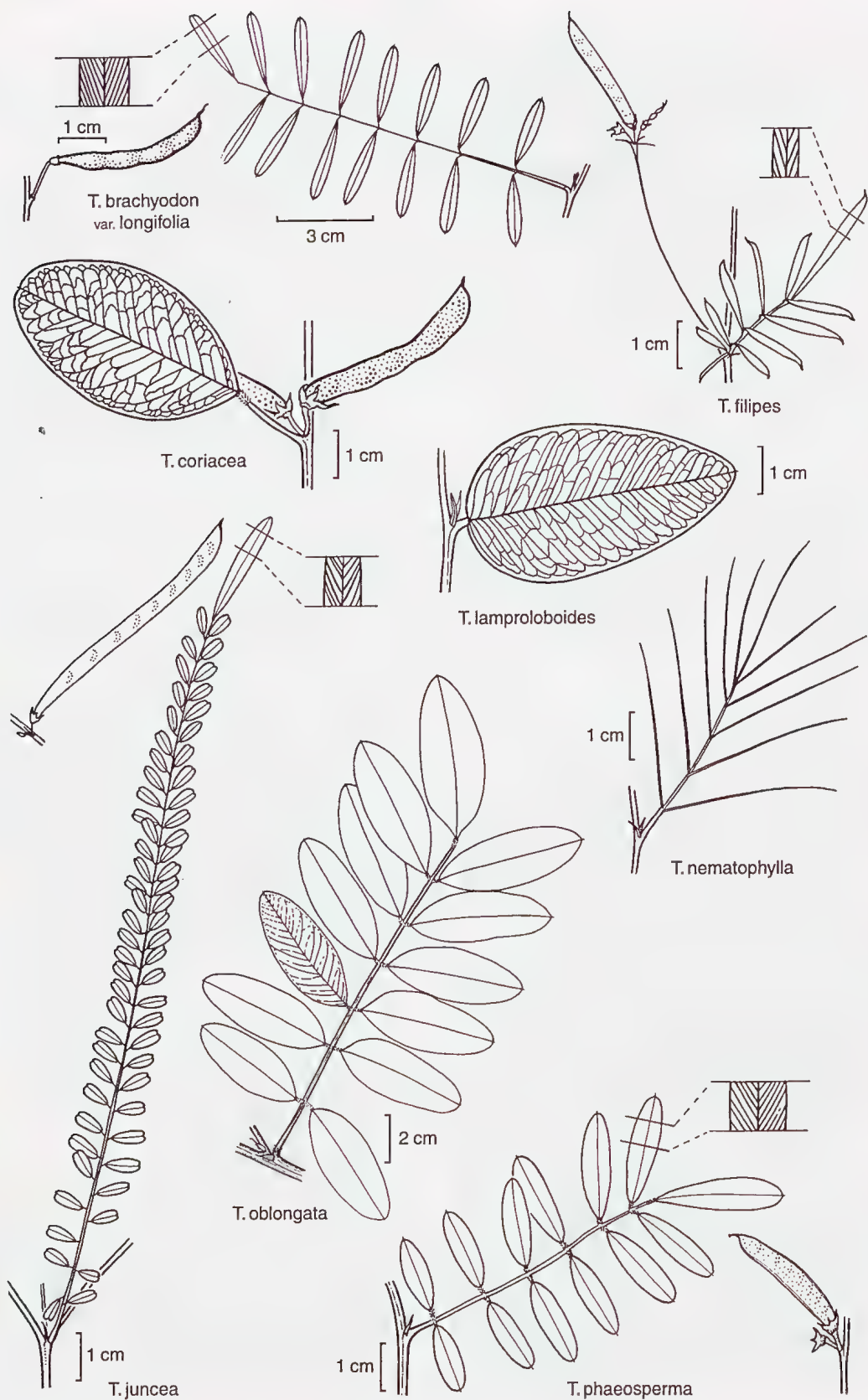


Fig. 30



in outline, rachis to basal leaflets 2-17 mm, 30-120 mm overall; *leaflets* in (2)4-12 pairs (decreasing in number toward the apex of trailing stems); slightly discoloured, narrowly elliptic to linear, occasionally elliptic, narrowly lanceolate or obovate, 6-37(50) mm long, 2-6(9) mm wide, L/W 2.1-16, 2° veins 45-90 degrees to midrib, 3° veins reticulate to obscure, base rounded or attenuate, apex obtuse or acute, mucro recurved. *Inflorescences* terminal or leaf-opposed, racemose, to 150 mm long, flowers 1-2 per node, often also axillary and fasciculate; bracts persistent, similar to stipules, c. 3 mm long. Pedicels 3-5 mm long. *Calyx* 3-5 mm long, lobes acuminate. *Corolla* orange; standard 8-10 mm long. *Pod* pale brown, linear, ± straight, flattened, raised over seeds, 25-27 mm long, c. 5 mm wide, margin slightly thickened, beak central, deflexed. *Seeds* 5-6, centres < pod width apart, brown to olivaceous, elliptic, c. 4 mm long, 3 mm wide; ecarunculate. *Flowering*: Aug - Apr; *fruiting*: Nov - Apr. Fig. 31

Endemic to the Top End and relatively common in the DR. Found in Eucalypt savanna, often on lateritic soils.

**T. remotiflora** F.Muell. ex Benth.

*T. subnuda* Domin

An erect annual herb or procumbent to erect perennial *subshrub* 20-80 cm tall. Indumentum of white to hyaline hairs, adpressed, rarely patent on vegetative and inflorescence parts, the leaves rarely sericeous above, pods tomentose. *Stipules* setaceous, 2-6 mm long. *Leaves* oblong in outline; rachis to basal leaflets 0-3(6) mm (in some forms to 21 mm), 16-41(85) mm overall; *leaflets* in (1)6-9(12) pairs; discoloured, narrowly obovate, cuneate, oblanceolate or narrowly elliptic, 8-25(37) mm long, 2-7(10) mm wide, L/W 1.5-5(7.5), 2° veins red or green below, closely spaced, c. 30 degrees to midrib, 3° veins obscure, base acute, apex emarginate, truncate or obtuse. *Inflorescences* terminal and leaf-opposed, racemose, unbranched, to 200 mm long, flowers 1-2 per node; bracts persistent, setaceous, 1-3 mm long. Pedicels 2-4 mm long. *Calyx* 2-3 mm long. *Corolla* purple, red or pink, rarely almost white; standard 4-6 mm long. *Pod* yellowish, pale brown or olivaceous, linear, curved toward apex, turgid, 20-35 mm long, 3-4 mm wide, beak marginal, straight. *Seeds* 5-8, centres > pod width apart, mottled pale and dark brown and olivaceous, oblong, 2.2-3 mm long, 1.8-2 mm wide; caruncle obscure. *Flowering*: Feb - May or in dry season on new growth after fire; *fruiting*: Feb - June. Fig. 31

Relatively common in the DR in Eucalypt savanna on sandy surfaced and other well drained soils, also on disturbed areas. A widespread, variable species

with intergrading forms. An annual form with patent hairs on the branchlets and sericeous hairs on the upper leaf surfaces can occur on coastal dunes. A perennial form with annual above ground parts and longer leaflets also occurs in the DR, often growing alongside annual forms. This perennial form includes *T. subnuda* which represents a stage of post-fire regrowth and has few pairs of leaflets and a greater interval from the leaf base to the first pair of leaflets.

**T. simplicifolia** F.Muell. ex Benth.

*T. graminifolia* F.Muell. ex Benth.

An erect, perennial *subshrub* to 0.5 m tall, with annual above ground parts. Indumentum of white hairs, sparse and adpressed to erect on vegetative parts, inflorescence pilose, pod tomentose. *Stipules* often green, narrowly triangular, 2.5-6 mm long. *Leaves* 1-foliolate (± stipellate) to 3-foliolate; rachis to basal leaflets (4)12-60 mm, (4)12-68 mm overall, *leaflets* concolorous, linear 52-133 mm long, 1.2-3.5 mm wide, L/W 35-85, 2° veins prominent below, c. 15 degrees to midrib, 3° veins obscure, base cuneate, often with a distinct marginal vein, apex acute, mucro absent. *Inflorescences* terminal, racemose, to 200 mm long, flowers 1(2) per node; bracts persistent, 2-4 mm long, narrowly triangular. Pedicels 7-9 mm long. *Calyx* 2-3 mm long; shallowly lobed. *Corolla* orange or red-mauve; standard 5.5-10 mm long. *Pod* pale brown, ± straight, turgid, 37-45 mm long, 3-3.5 mm wide, beak marginal, straight or slightly deflexed. *Seeds* 11-13 per pod, centres c. pod width apart, olivaceous, oblong, oblong in cross section, c. 2.1 mm long, 1.9 mm wide, ecarunculate. *Flowering*: Dec - Apr; *fruiting*: Apr. Fig. 31

Widespread in tropical Australia, but uncommon in the DR. Occurs in Eucalypt savanna on well drained lateritic and red earth soils. Sometimes difficult to distinguish from *T. leptoclada*.

**T. spechtii** Pedley

*T. purpurea* (L.) Pers. var. *axillaris* Baker f.

An erect or multi-stemmed perennial *shrub* to 1.5 m tall. All parts with sparse adpressed white hairs, vegetative and inflorescence parts often almost glabrous or sometimes sericeous, the leaves rarely tomentose or sparsely sericeous above. *Stipules* ± caducous, setaceous or narrowly triangular, 5-8 mm long. *Leaf* rachis to basal leaflets (5)12-20 mm, 25-62 mm overall; *leaflets* in 2-7 pairs, slightly discoloured, oblanceolate or elliptic, 10-37 mm long, 4-10 mm wide, L/W 2.9-6, 2° veins not prominent, c. 30-45 degrees to midrib, 5-9 pairs, 3° veins obscure, undersurface appearing wrinkled, base acute to attenuate, apex obtuse or retuse, occasionally truncate. *Inflorescences* of axillary fascicles and/or terminal



pseudoracemes, to 300 mm long, flowers 1-4 per node; bracts caducous. Pedicels (4)7-10 mm long. *Calyx* 2-3 mm long; shallowly lobed. *Corolla* orange; standard 8-10 mm long. *Pod* stramineous to reddish, linear, upcurved towards the apex, turgid, 47-73 mm long, c. 4 mm wide, apex shortly beaked. *Seeds* 9-13, centres c. pod width apart, mottled black, brown and yellow, oblong or reniform, 2.8-3 mm long, 2-2.4 mm wide, ecarunculate. *Flowering*: Jan - May; *fruiting*: Mar - July. Fig. 31

Widespread in the Kimberley and the NT. Rare in the DR where known only from the upper headwaters of Hayward Creek. Usually on sandy soils associated with sandstone outcrops, occasionally on coastal sand dunes in eastern Arnhem Land.

### **T. subpectinata** Domin

An annual or short-lived perennial *shrub* to 60 cm tall. All parts with sparse, short white adpressed hairs. *Stipules*  $\pm$  caducous, setaceous or subulate, 3-6 mm long. *Leaf* rachis to basal leaflets 5-15(19) mm, 30-50(80) mm overall; *leaflets* in (2)4-8(10) pairs, slightly discolorous, very narrowly elliptic, or almost filiform to narrowly oblanceolate, 8-30 mm long, 1-3 mm wide, L/W 5-20, 2° veins not prominent, c. 30 degrees to midrib, 3° veins obscure, undersurface appearing wrinkled, base cuneate to attenuate, apex obtuse or acute. *Inflorescences* terminal and axillary, racemose, often with a few fascicles in the upper axils, unbranched, 100-200 mm long, flowers 1-3 per node; bracts caducous, subulate c. 2 mm long. Pedicels 2-5 mm long. *Calyx* 1.5-3.6 mm long; shallowly lobed, lobes acuminate. *Corolla* orange; standard 5-8.5 mm long. *Pod* stramineous to pale brown, linear, upcurved towards the apex, turgid, 37-50 mm long, 3.5-4 mm wide, beak marginal, upturned. *Seeds* 6-9, centres > pod width apart, pale brown or olivaceous with darker mottles, oblong to reniform, 3-3.5 mm long, 2-2.5 mm wide; hilum central; ecarunculate. *Flowering*: Jan - Mar; *fruiting*: Mar - May. Fig. 31

Widespread in northern Australia, on sandy soils associated with sandstone outcrops. In the DR, known from the Tabletop Range in Litchfield NP and Mount Douglas. This species is known as *T. savannicola* Domin in the Flora of the Kimberley Region (Wheeler, 1992), but the latter has purple flowers and longer leaves with more numerous leaflets (Domin, 1926). Some forms from Litchfield and Kakadu have shorter, broader leaflets and approach *T. spechtii*.

### **T. 'Hayes Ck'**

Perennial subshrub with prostrate annual above ground parts. All parts densely sericeous or densely

tomentose with white hairs. *Stipules* narrowly triangular, 3-6 mm long. *Leaves* ground-hugging, (1)3(5)-foliolate; rachis to basal leaflets 1-4 mm long, 6-17 mm overall; *leaflets* strongly discolorous, dorsiventral, elliptic to orbicular, occasionally ovate to cuneate, 24-78(97) mm long, 18-56 mm wide, L/W 0.9-1.9(2.7), 2° veins c. 60 degrees to midrib, 3° veins reticulate, base rounded, apex obtuse, emarginate or truncate. *Inflorescences* terminal and axillary, racemose, to 500 mm long, flowers 1-2 per node; bracts persistent, narrowly triangular, c. 4 mm long. Pedicels c. 5 mm long. *Calyx* 5-6 mm long, lobes acuminate. *Corolla* orange or yellow, rarely mauve, gland dotted; standard 9-13 mm long. *Pod* white to brown, linear, straight, flattened, 35-65 mm long, 6-7 mm wide, beak central, straight. *Seeds* 7-12, centres < pod width apart, olivaceous, suborbicular, flat-sided, 3-3.5 mm diam, ecarunculate. *Flowering*: Nov - Apr; *fruiting*: Dec - Mar. Fig. 31

Found in the DR, Kakadu NP and the Kimberley. Relatively common in the Hayes Creek - Tabletop Range area and known from Melville Is. Associated with sandstone substrates in a variety of situations, from rocky knolls to creek flats.

### **T. 'Katherine Gorge'**

An erect perennial *shrub* to 1.5 m tall. All parts with adpressed yellowish brown (rarely white) hairs, inflorescence parts sometimes sericeous. *Stipules* caducous, subulate, 2-4 mm long. *Leaf* rachis to basal leaflets 9-24 mm long, 60-160 mm overall; *leaflets* in 5-10 pairs, slightly discolorous, dorsiventral, narrowly elliptic to narrowly lanceolate, (19)26-46 mm long, 3-6 mm wide, L/W 5-12, 2° veins prominent below, c. 45 degrees to midrib, 3° venation reticulate to obscure, base obtuse, apex acute or obtuse. *Inflorescences* terminal and axillary, racemose, 90-160 mm long, flowers 1-3 per node; bracts caducous, subulate, c. 2 mm long. Pedicels 3-8 mm long. *Calyx* 3.5-4 mm long, the upper pair of lobes fused to within 1 mm of their apices. *Corolla* orange; standard 9-10 mm long. *Pod* pale to dark brown, linear, straight, turgid, 38-42 mm long, 3.5-4 mm wide, beak marginal, straight. *Seeds* c. 8, centres c. pod width apart, separated by spongy septa, mottled, olivaceous and black, elliptic, oblong in cross-section, c. 3 mm long, 2.5 mm wide; hilum towards end of seed; caruncle green, flattened, asymmetric, c. 1 mm diam. *Flowering*: Jan - Feb; *fruiting*: Apr. Fig. 31

Relatively rare and endemic to the western Top End, where it occurs amongst sandstone outcrops on sandy soil. In the DR recorded from Litchfield NP.

Tephrosia

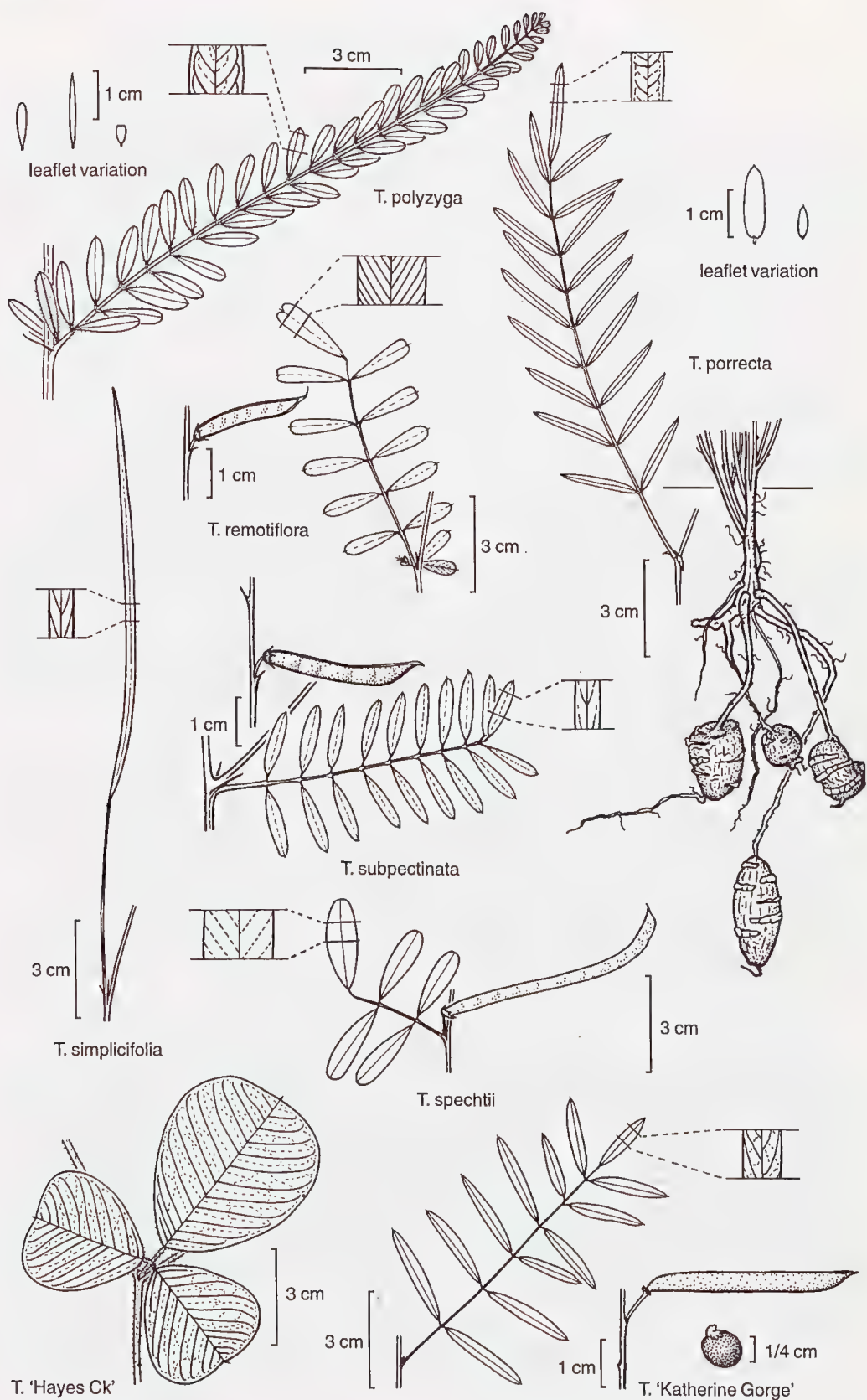


Fig. 31

## URARIA Desv.

Perennial herbs with annual stems. Stipules persistent, striate. Leaves 1- or pinnately 3-foliolate; stipels persistent. Inflorescence of terminal or axillary densely flowered spike-like racemes. Bracteoles absent. Calyx unequally 5-lobed, the 2 vexillary lobes short and broad, the rest long and subulate. Corolla purple, glabrous; standard without a claw, obovate; wing and keel petals clawed, pouched at basal lobes. Stamens 9+1, filaments alternately long and short; anthers uniformly dorsifixed and versatile. Ovary sessile or nearly so; style geniculate; stigma capitate, minute. Pod of 2 or more white or dark grey concertina'd articles, shorter than the calyx; articles breaking free, inflated, indehiscent, glabrous, smooth or reticulately veined. Seeds ecarunculate.

About 35 species in the Old World tropics; 3 in tropical Australia, 2 in the DR.

- |                                                                          |                         |
|--------------------------------------------------------------------------|-------------------------|
| 1. Leaflets linear or linear-lanceolate, >13 times as long as wide ..... | <b>U. 'Litchfield'</b>  |
| 1. Leaflets never linear, <5 times as long as wide .....                 | <b>U. lagopodioides</b> |

### **U. lagopodioides (L.) Desv. ex DC.**

*U. cylindracea* Benth.

Semi erect to prostrate. Vegetative parts densely covered with patent white, hyaline or ferruginous simple, long and short hairs and hooked hairs. *Stipules* acuminate, to 9 mm long. *Leaves* 1 or 3-foliolate; rachis 9-65 mm long; *leaflets* variable, from oblong to orbicular, lanceolate or oblanceolate, 20-105 mm long, 8-62 mm wide, L/W 1.4-3.5, scabrous above, softly hairy below, prominently reticulately veined below, base rounded or cordate, apex variable, usually mucronate; basal leaflets much smaller than the terminal. *Inflorescence* to 145 mm long. Rachis densely covered with patent long ferruginous hooked hairs and long and short simple hairs; bracts persistent, broad based, acuminate, striate, 6-9 mm long, densely hirsute to ciliate with simple white or ferruginous hairs. Pedicels 4-6 mm long, vestiture similar to inflorescence rachis with hooked hairs often in a band below the calyx. *Calyx* 5-8 mm long, tube with

minute hairs; lobes to 4/5 of total length, hirsute with long white bristles, hooked hairs and occasional yellow glandular based septate hairs. Standard 5-7 mm long. Ovary 2-ovuled. Articles of pod c. 4 mm long, 3 mm wide. Seeds olivaceous, c. 3 mm long, 2 mm wide. *Flowering*: Jan - Mar; *fruiting*: Mar - Apr. Fig. 32

Widely distributed from tropical regions of the Pacific to China. In Australia in WA, Qld and the NT; common in the DR in Eucalypt savanna on a variety of well drained soils.

### **U. 'Litchfield'**

Distinguished from *U. lagopodioides* by the leaflets which are linear or linear-lanceolate, 55-165 mm long, 3-9 mm wide, L/W 13-33. Fig. 32

Known from few specimens, from Litchfield and Nitmiluk NP. Similar in many respects to *U. picta* (Jacq.) Desv. (Qld, Asia) but with fewer leaflets.

## VIGNA Savi

Twining vines with perennial roots and annual aerial stems, sometimes short-lived perennials or annuals. Stipules persistent. Leaves pinnately 3-foliolate; stipels persistent. Inflorescence few-flowered, racemose, the flowers clustered at the apices of axillary peduncles. Bracteoles at base of calyx, persistent or caducous. Calyx 5-lobed, the upper lobes usually shorter. Corolla yellow or white to mauve, glabrous. Standard broad, shortly clawed with inflexed auricles; wings lamellate; keel petals joined partly on both margins, strongly curved or coiled with an orifice below the apex. Stamens 9+1, filaments alternately long and short, the free part to c. 1/2; anthers dorsifixed, versatile or fixed. Ovary sessile; style curved or coiled, upper part dilated or not, bearded below; stigma lateral. Pod dehiscent, cylindrical or flat. Seeds usually quadrate, with or without a caruncle.

Pantropical genus of c. 150 species; c. 12 species in Australia, 5 in the NT, 4 in the DR. The genus is an important source of forage and pulse crops, including *V. unguiculata* - Cow Pea, Snake Bean; *V. mungo* - Black Gram and *V. radiata* - Mung Bean (Purseglove, 1968; Macmillan, 1991). The tubers of several species are edible or have medicinal uses amongst Aboriginal people.



- |    |                                                                                                   |                      |
|----|---------------------------------------------------------------------------------------------------|----------------------|
| 1. | Stipules peltate; seed coat patterned with fine longitudinal lamellae and transverse striae ..... | <b>V. radiata</b>    |
| 1. | Stipules not peltate; seed not sculptured as above .....                                          | <b>2</b>             |
| 2. | Flowers yellow; pod 20-35 mm long. ....                                                           | <b>V. lanceolata</b> |
| 2. | Flowers mauve or purplish; pod 80-130 mm long. ....                                               | <b>3</b>             |
| 3. | Pod cylindrical, hairy; leaflets linear-lanceolate, lanceolate to ovate; keel curved .....        | <b>V. vexillata</b>  |
| 3. | Pod flat, glabrate; leaflets ovate to orbicular; keel coiled .....                                | <b>V. adenantha</b>  |

### **V. adenantha** (G.Mey.) Marechal

Vigorous, short-lived perennial vine. Vegetative parts and pod sparsely hairy with simple and tubercular based hairs and minute vesicular glands on underside of leaves. *Stipules* c. 3 mm long, triangular, striate. Rachis to basal leaflets 40-77 mm, 50-100 mm overall; leaflets ovate to orbicular, 62-123 mm long, 40-102 mm wide, L/W 1.2-1.7; basal leaflets asymmetric. *Inflorescence* to 350 mm long, flowers arising from glandular swellings. Bracteoles caducous, 2-3.5 mm long. *Calyx* 7-10 mm long, lobes c. half total length, the 2 upper lobes incurved. *Corolla* white, suffused with purple or pink blushes; standard broader than long, c. 25 mm long, emarginate; wings partly adnate to keel; keel strongly coiled. *Pod* greenish, straight or slightly falcate, coriaceous, raised over seeds, 80-130 mm long, c. 9 mm wide, with slightly thickened margins. *Seeds* 8-14, c. 8 mm long, 6 mm wide, caruncle obscure. *Flowering*: July - Sept; *fruiting*: Aug - Oct. Fig. 32

Pantropical; in Australia in Qld and NT; in the DR, known only from Manton Dam. On margins of perennial streams and swamps. Aborigines eat the tap root raw or cooked (Levitt, 1981).

### **V. lanceolata** Benth. var. **filiformis** Benth.

Perennial twining vine with annual aerial stems; amphicarpic. Vegetative parts glabrate, the hairs simple, stiff, short. *Stipules* c. 2 mm long, extending shortly below point of attachment. Rachis to basal leaflets 23-47 mm, 27-60 mm overall; stipels obtuse; leaflets linear or linear-lanceolate, 40-80 mm long, 3-8 mm wide, L/W 6-23, 2° veins + at right angles to midrib, scabrous. *Inflorescence* an axillary few-flowered raceme on a triquetrous peduncle 20-40 mm long. Pedicels 2-3 mm long. *Calyx* 3-4 mm long, glabrate; lobes subequal, c. 1/3 of total length. *Corolla* yellow; standard broader than long, c. 8 mm long; orifice in keel with recurved margins. Anthers versatile. Ovary hairy. *Pod* brown, straight, flat, 20-35 mm long, smooth. *Seeds* 5-6, mottled, 4.2-5 mm long, 3-3.5 mm wide; hilum towards one end; caruncle

white, c. 2 mm long. *Flowering*: Jan - June; *fruiting*: Apr - Aug. Fig. 32

Australian endemic (WA, NT, Qld); in the NT, occurring on lateritic and sandy soils in Eucalypt savanna from Darwin to eastern Arnhem Land. The root tuber is eaten after preparation (Levitt, 1981; O'Connell *et al.*, 1983; Smith *et al.*, 1993; Russell-Smith, 1985; Wightman *et al.*, 1992) and pods can be eaten raw (Levitt, 1981).

### **V. radiata** (L.) R.Wilczek var. **sublobata** (Roxb.) Verdc.

Annual or perennial-rooted twining vine. Vegetative parts and pods hispid and scabrous with short, stiff, hyaline or brown tubercular based hairs. *Stipules* peltate, striate, (3)6-11 mm long. Rachis to basal leaflets 25-120 mm, (30)44-143 mm overall, hairs retrorse; stipels c. 5 mm long; leaflets thin, ovate-lanceolate, deltoid or rhomboid, rarely narrowly oblong, often lobed or asymmetric, 30-116 mm long, (7)25-83 mm wide, L/W 1.2-1.9; hairs antrorse. *Inflorescence* of c. 6 flowers, peduncles 20-160 mm long, apices glandular; hairs retrorse. Bracteoles c. as long as the calyx. *Calyx* c. 3 mm long, lobes c. 1/3 of total length. *Corolla* pale yellow; standard asymmetric, + twisted, broader than long, c. 10 mm long; keel and style strongly twisted, one petal with a prominent spur. *Pod* brown, cylindrical, 54-66 mm long, 3-5 mm wide; hairs antrorse. *Seeds* 10-13, brown, cylindrical, 3-4 mm long, 2-3 mm wide, seed coat with a regular pattern of longitudinal lamellae and transverse striae. *Flowering* and *fruiting*: Mar - June. Fig. 32

Widespread from Africa to tropical Australia; in the NT and the DR, mainly coastal or subcoastal in seasonally moist and often shaded sites *Vigna radiata* var. *radiata* (Mung Bean) differs from this variety in being erect with unlobed leaves; it has not been recorded wild in the NT.

### **V. vexillata** (L.) A.Rich.

Hairs of all parts tubercular based, short, stiff, often

brown. *Stipules* cordate, striate, 4-6 mm long. *Leaves* sometimes appearing digitate; rachis to basal leaflets 15-53 mm, 20-85 mm overall; hairs of the rachis retrorse to patent; *leaflets* discolorous, linear-lanceolate to ovate, 33-150 mm long, 4-12 mm wide, L/W 7.5-24; venation reticulate with prominent looping 2° veins; scabrous with antrorse hairs or hairs spreading. *Inflorescence* axillary, racemose, peduncles to 260 mm long, retrorsely hairy; flowers 1-4, clustered at swollen, glandular apex. *Calyx* 7-10 mm long, lobes 1/2 total length; prominently veined, antrorsely hairy. *Corolla* mauve; standard asymmetric,

broadly than long, 15-19 mm long; wings shortly clawed, keel petals twisted to one side, one petal with a prominent spur. *Pod* dark brown, linear, cylindrical, 80-120 mm long, 4-5 mm wide, antrorsely hairy, valves spirally twisting at dehiscence. *Seeds* red-brown, mottled. *Flowering*: Nov - May; fruiting: Apr - June. Fig. 32

The tuber is eaten raw or after cooking (Altman, 1984; Russell-Smith, 1985; Smith & Wightman, 1990) and is mashed to treat abdominal wounds (Scarlett *et al.*, 1982). Raw tubers cure diarrhoea (Levitt, 1981). Two varieties are recognised.

- |                                                                    |                          |
|--------------------------------------------------------------------|--------------------------|
| 1. Leaflets linear-lanceolate, 7.5-24 times as long as wide .....  | var. <b>angustifolia</b> |
| 1. Leaflets lanceolate or ovate, 2-3.2 times as long as wide ..... | var. <b>vexillata</b>    |

**V. vexillata** var. **angustifolia** (Schum. & Thonn.) Baker

Rachis to basal leaflets 43-53 mm, 52-85 mm overall, hairs of the rachis retrorse; *leaflets* linear-lanceolate, 70-150 mm long, 4-12 mm wide, L/W 7.5-24.

Found in the Old World tropics including tropical Australia. Common in the DR on well drained sites in open habitats.

**V. vexillata** var. **vexillata**

Rachis to basal leaflets 15-42 mm, 20-52 mm overall; *leaflets* lanceolate or ovate, 33-65 mm long, 12-31 mm wide, L/W 2-3.2.

Widespread throughout the tropics including tropical Australia. Relatively uncommon in the DR; on well drained sites in open savanna habitats.

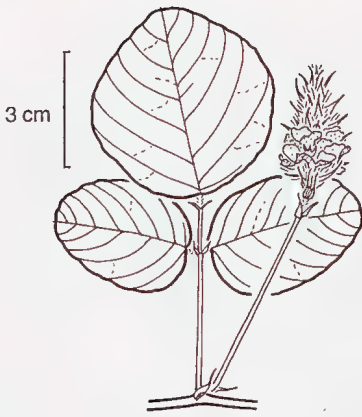
## ZORNIA J.G.Gmelin

Annual or perennial herbs with annual aerial parts. Hairs simple; pellucid glands often present on vegetative parts. *Stipules* peltate, persistent (except *Z. chaetophora*), prominently nerved. Leaves digitately 2-foliolate; stipels absent. Juvenile leaflets (rarely present), broader than the adults. *Inflorescence* a terminal or axillary spike. Bracts paired, peltate, prominently nerved, enclosing the flowers. Bracteoles absent. *Calyx* membranous, 5-lobed, the 2 upper lobes connate for the most part, ciliate. *Corolla* yellow, glabrous; petals all clawed; standard suborbicular, without auricles or calli; wings lamellate; keel incurved. Stamens connate into a tube, the tube circumsciss in upper part, the basal part persisting; anthers alternately long and fixed near base, and short and versatile. Ovary sessile, ovules numerous. Style glabrous; stigma terminal, minute. Pod of 2-9 indehiscent articles. Seeds ecarunculate.

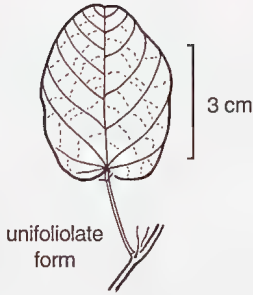
Pantropical, c. 75 species worldwide. In Australia 17 species, 10 in the NT, 7 in the DR. [Reynolds & Holland, 1989]

- |                                                          |                       |
|----------------------------------------------------------|-----------------------|
| 1. Leaflets linear, >6 times as long as wide .....       | 2                     |
| 1. Leaflets not linear, <5 times as long as wide .....   | 4                     |
| 2. Bristles on fruit conspicuous, to 3.5 mm long .....   | <b>Z. chaetophora</b> |
| 2. Bristles on fruit inconspicuous, c. 0.5 mm long ..... | 3                     |
| 3. Inflorescence bracts 9-11 mm long .....               | <b>Z. acuta</b>       |
| 3. Inflorescence bracts 5-7 mm long .....                | <b>Z. areolata</b>    |
| 4. Inflorescence bracts eglandular .....                 | 5                     |
| 4. Inflorescence bracts pellucid-glandular .....         | 6                     |

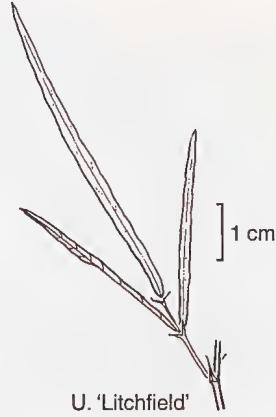
**Uraria**



*U. lagopodioides*

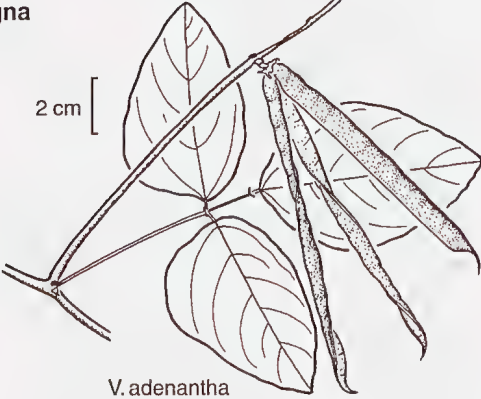


unifoliate form

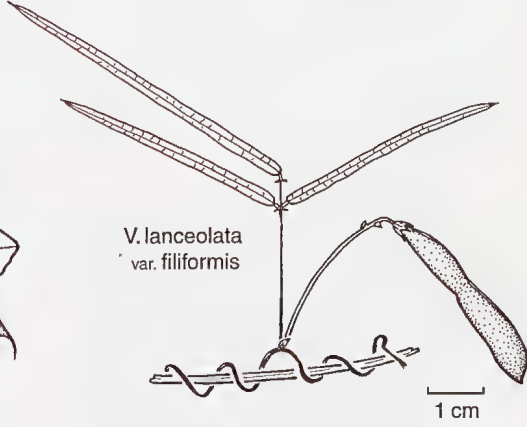


*U. 'Litchfield'*

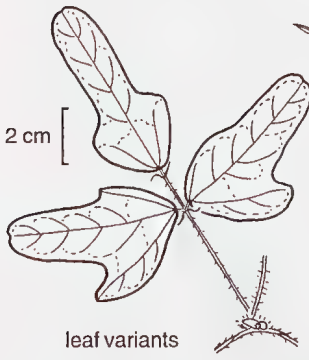
**Vigna**



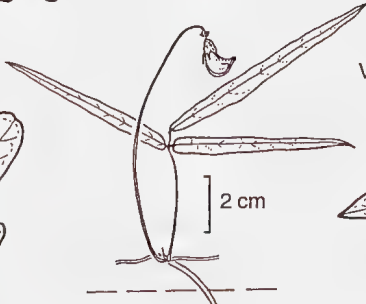
*V. adenantha*



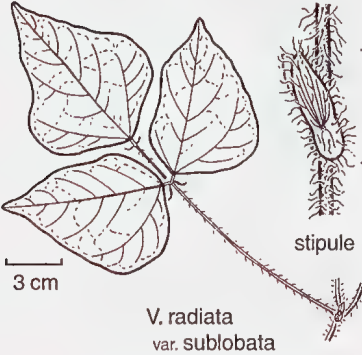
*V. lanceolata*  
var. *filiformis*



leaf variants



*V. vexillata*



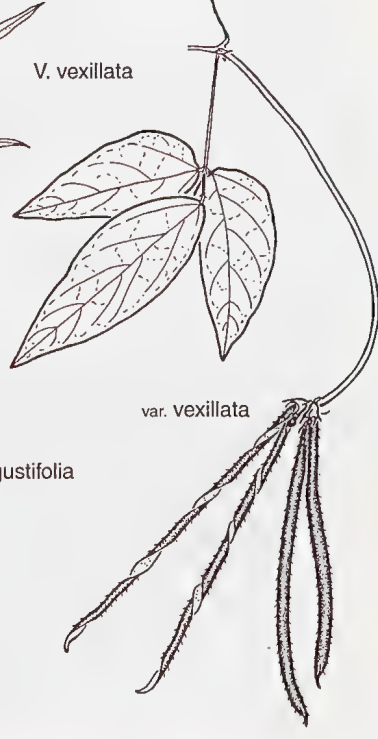
*V. radiata*  
var. *sublobata*



stipule



var. *angustifolia*



var. *vexillata*



- |    |                                                                             |                          |
|----|-----------------------------------------------------------------------------|--------------------------|
| 5. | Articles mainly glabrous, bristles glabrous; articles 1.5-1.7 mm long ..... | <b>Z. 'Darwin Lawns'</b> |
| 5. | Articles white tomentose, bristles hairy; articles 2.2-3.2 mm long .....    | <b>Z. prostrata</b>      |
| 6. | Vine, stems trailing; leaflets 6-10 mm wide .....                           | <b>Z. muelleriana</b>    |
| 6. | Subshrub, stems not trailing; leaflets 2.5-5 mm wide .....                  | <b>Z. disticha</b>       |

### **Z. acuta** S.Reyn. & Holland

Annual, stems prostrate. Vegetative parts glabrous, pellucid glandular. *Stipules* 9-13 mm long. Leaf rachis 10-15 mm long; *leaflets* drying black, linear, 18-38 mm long, 1.3-2.3 mm wide, L/W 10-15. *Inflorescence* to 80 mm long, to 8-flowered. Bracts + as long as internodes, ovate, c. 11 mm long, sparsely ciliate. *Flowers* and fruit not seen. Fig. 33

Australian endemic known from the Kimberley and the NT where it has been collected once from near Darwin.

### **Z. areolata** Mohl.

Prostrate annual or (?) perennial rooted *herb* with annual stems. Vegetative parts sparsely hairy with simple hairs; stems, leaves, stipules and bracts pellucid glandular. *Stipules* narrowly elliptic, 3-6 mm long. Leaf rachis 3.5-12 mm long; *leaflets* linear, 7-25 mm long, 0.7-3 mm wide, L/W 6-16. *Inflorescence* to 70 mm long, of 2-7 spaced flowers; bracts asymmetric, obovate, 5-7 mm long. *Calyx* 2-3 mm long, lobes 1/3-1/2 total length. Standard c. 6 mm long. *Pod* 2-4-articled, to 10 mm long, 1.5-2.5 mm wide; articles with patent and retrorse-appressed hairs and prominently reticulately veined, the veins with divaricate and retrorsely hairy bristles. *Seeds* pale and dark brown, + semicircular, c. 1.7 mm long, 1 mm wide. *Flowering* and fruiting: Jan - Apr. Fig. 33

Australian endemic; Qld and NT. In the NT, from the coast to Katherine but relatively rare in the DR. On skeletal and sandy soils in savanna.

### **Z. chaetophora** F.Muell.

Erect, virgate, sparsely foliated perennial (? annual) *subshrub* to 0.7 m high. Plant glabrous or almost so; pustular glandular throughout. *Stipules* and leaflets deciduous; stipules 4-8 mm long. Leaf rachis 8-30 mm long; *leaflets* linear or narrowly elliptic, 10-44 mm long, 1-6 mm wide, L/B (3.3)5-16. *Inflorescence* to 150 mm long, of 3-9 spaced flowers; bracts oblanceolate, 6-9 mm long, ciliate. *Calyx* 3-4.5 mm long, lobes c. 1/2 total length. Standard 6-7 mm long. *Pod* 1-4-articled; to 23 mm long, c. 2.5 mm wide; articles densely covered with glabrous or hairy bristles to c. 3.5 mm long, otherwise with a tomentum of short white hairs. *Flowering* and fruiting: most months. Fig. 33

Australian endemic; in the southern part of the Kimberley and the southern part of the tropical monsoon region in the NT. In the DR towards the Daly R.; rare.

### **Z. disticha** S.Reyn. & Holland

Perennial *herb* to 30 cm high. Vegetative parts glabrous or sparsely hairy, pellucid glandular. *Stipules* 4-7 mm long. Leaf rachis 7-13 mm long; *leaflets* narrowly elliptic, 10-18 long, 2.5-5 mm wide, L/B c. 5. *Inflorescence* to 85 mm long, 7-11-flowered; bracts imbricate, ovate, c. 8 mm long, ciliate. *Pod* 4-articled, c. 6 mm long, 1.5 mm wide, bristles of the reticulum retrorsely hairy, otherwise white tomentose, sparsely gland dotted. *Flowering* and fruiting: Mar. Fig. 33

A rare species recorded from Papua New Guinea and Darwin. One specimen only has been seen, from a grassy flat at East Point, Darwin.

### **Z. muelleriana** Mohl. subsp. *muelleriana*

Leaf rachis 5-17 mm long; *leaflets* slightly asymmetric, elliptic, 14-21 mm long, 6-10 mm wide, L/B 2-3.5. The characters otherwise match *Z. disticha*. Fig. 33

Not well represented in the NT, although relatively common in Qld. The leaf description is taken from 2 specimens, collected at Mt Bunday and Nabalek.

### **Z. prostrata** S.Reyn. & Holland

Prostrate perennial with annual stems. Vestiture of vegetative parts variable, from almost glabrous to sparsely sericeous or pilose; pellucid glands sparse, minute and obscure; veins of the stipules, leaflets and bracts often reddish. Leaf rachis 8-25 mm long; *leaflets* asymmetric, ovate or elliptic, 7-37 mm long, 3.2-20 mm wide, L/B 1.4-3. *Inflorescence* 5-18-flowered; bracts + imbricate, elliptic to obovate, 5-11 mm long, ciliate. Standard asymmetric, 5-9 mm long. *Pod* 3-5-articled, 8-13 mm long, 1.8-2.5 mm wide, thinly white tomentose, the reticulate veins with stiff, retrorsely hairy bristles. *Flowering* and fruiting: Jan - July(Nov). Fig. 33

Endemic to tropical Australia. Relatively common in the DR. In Eucalypt savanna on sandy soils, on sandstone and on beach dunes. A variable species; a large flowered variety occurs

on sandstone in the Edith Falls to Waterfall Creek area. A type specimen at DNA of *Z. oligantha* S.Reyn. & Holland from Cobourg Peninsula does not fit the original description. Also, additional collections from that area link the type of *Z. oligantha* with *Z. prostrata* and show continuous variation in the pod and other characters used to separate the two species. The species growing in Darwin lawns and formerly included under *Z. oligantha* appears to be a distinct taxon and is treated below.

### *Z. 'Darwin Lawns'*

Perennial rooted semi-prostrate herb with annual

stems. Vegetative parts thinly and softly pilose, eglandular or nearly so. Stipules 5-13 mm long. Leaf rachis 9-15 mm long; leaflets slightly asymmetric, elliptic, narrowly elliptic or ovate-lanceolate, 9-28 mm long, 4-10 mm wide, L/B 2-3.6. Inflorescence to 80 mm long, of 2-8 interrupted or subimbricate flowers. Bracts ovate or elliptic, 8-9 mm long, ciliate. Calyx c. 3 mm long, lobes c. 1/2 total length. Standard c. 5.5 mm long. Pod 4-6-articled, 8-9.5 mm long, 1.3-1.8 mm wide; articles almost glabrous, reticulately veined, the veins with sparse, short, glabrous bristles. Flowering and fruiting: Feb - Apr (Oct). Fig. 33

In the NT and the DR, known only as a weed in Darwin lawns.

### *Zornia*

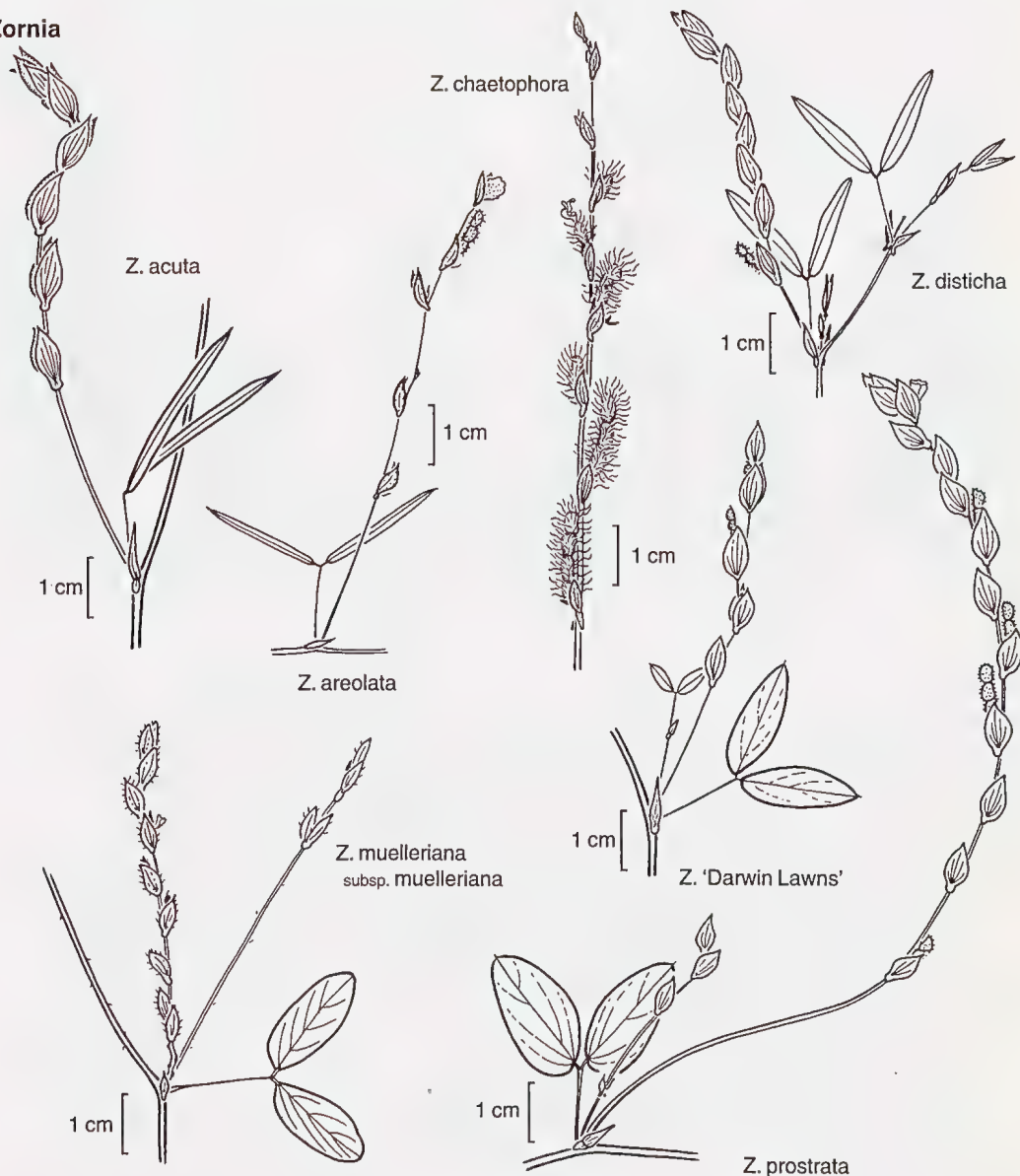


Fig. 33

PROTEACEAE

Evergreen shrubs or trees. Stipules absent. Leaves mostly alternate, simple, entire or variously lobed. Inflorescences basically racemose with flowers commonly in pairs. Flowers usually bisexual, strongly zygomorphic or actinomorphic, 4-merous. Perianth of 4 petaloid tepals, free, cohering into a tube or fused, sometimes arising from rim of hypanthium. Stamens 4; filaments partly or wholly fused to tepals. Hypogynous glands often present, usually 4, alternating with tepals. Ovary superior, 1-carpellate, sometimes stipitate, 1-locular, ovules 1-2(many); style simple, commonly expanded below or around the small terminal to lateral stigma into a pollen presenter. Fruit a dehiscent woody to leathery follicle or a fleshy drupe. Seeds 1-many, often winged. Fig. 34

A world-wide family of c. 80 genera and 1500 species; predominantly in the warmer regions of the southern hemisphere. In Australia about 50 genera and 900 species; 6 genera in the NT, all recorded in the DR. [Johnson & Briggs, 1975]

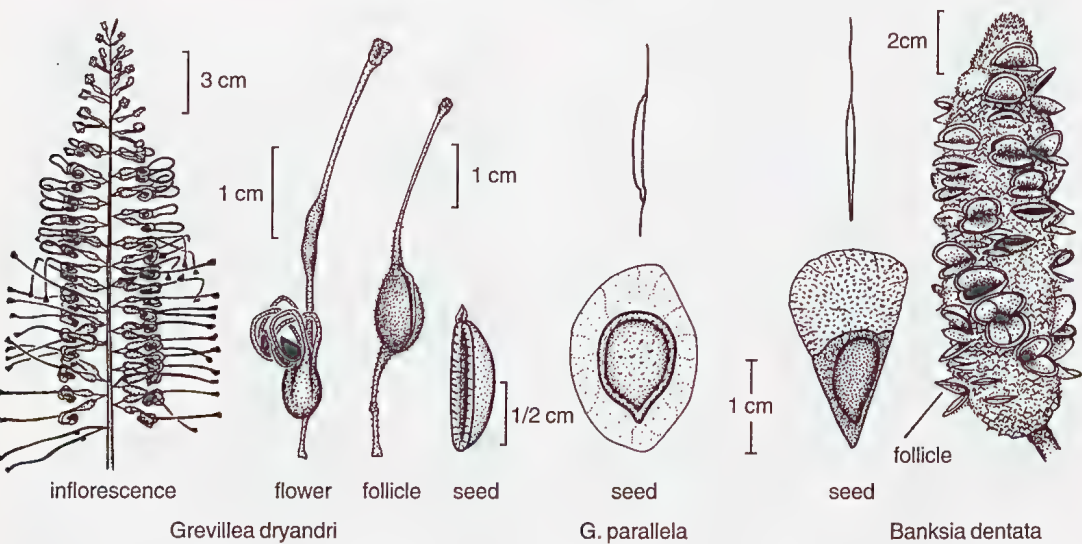


Fig. 34

|    |                                                                                 |             |
|----|---------------------------------------------------------------------------------|-------------|
| 1. | Flowers sessile, in dense cone-like inflorescences .....                        | Banksia     |
| 1. | Flowers pedicellate, not embedded in inflorescence axis .....                   | 2           |
| 2. | Fruit fleshy .....                                                              | 3           |
| 2. | Fruit dry, leathery or woody .....                                              | 4           |
| 3. | Fruit purplish, drying black; rainforest .....                                  | Helicia     |
| 3. | Fruit greenish yellow; open forest .....                                        | Persoonia   |
| 4. | Fruit linear, >30 mm long .....                                                 | Stenocarpus |
| 4. | Fruit ± ellipsoid or orbicular, mostly <30 mm long, rarely to 35 mm long .....  | 5           |
| 5. | Fruit with solid woody valves .....                                             | 6           |
| 5. | Fruit with thin concave valves .....                                            | Grevillea   |
| 6. | Leaves entire; seed winged at one end; inflorescence <50 mm long .....          | Hakea       |
| 6. | Leaves deeply lobed; seed encircled by wing;<br>inflorescence >50 mm long ..... | Grevillea   |



## BANKSIA L.f.

A predominantly Australian genus of c. 72 species with 1 species extending to New Guinea and eastern Indonesia. One species in the NT. [Taylor & Hopper, 1988; George, undated]

### *B. dentata* L.f.

*Shrub* or small tree to 6 m. Branchlets densely pubescent with closely tangled crisped hairs, interspersed with longer patent hairs. Petiole 10-12 mm long. *Leaf blades* strongly discolorous, oblanceolate to spatulate, 140-270 mm long, 47-70 mm wide, L/W 3.3-5.7, glabrous above, densely white arachnoid below, lateral veins  $\pm$  at right angles, deeply dentate with lobes spinose. *Inflorescence* terminal, spike-like, densely flowered, rachis thick and woody, to 170 mm long and 100 mm wide. *Flowers* zygomorphic. *Perianth* free, grey silky pubescent. Hypogynous glands present. *Style* yellow, glabrous,

pollen presenter not differentiated, erect, linear. *Infructescence* fusiform, woody, with many transversely orientated follicles, golden pubescent, 80-110 mm long, c. 40 mm wide; follicles c. 15 mm wide, opening by 2 hard woody valves. *Seeds* 2, with a thickened separator between them, wedge-shaped, black, c. 11 mm long, wing on one end, c. 9 mm long. *Flowering*: Mar - Aug; *fruiting*: June - Aug. Fig. 34, 35

Occurs from eastern Indonesia, New Guinea to northern Australia; common in the DR on sandy, seasonally wet areas. The rachis of the infructescence is used for carrying fire (Wightman & Brown, 1994).

## GREVILLEA R.Br.

Shrubs or trees. Flowers zygomorphic; receptacle (torus) concave, transverse to oblique on the pedicel. Hypogynous glands free or variously fused or lobed. Ovary stipitate or sessile; ovules 2; pollen presenter discoid to  $\pm$  conical, oblique to erect or lateral on the style. Fruit a follicle; seeds (1)2, with a membranous wing or with a terminal elaiosome.

A genus of c. 260 species, mainly Australian but a few species extend to New Guinea, Indonesia and New Caledonia. Thirty four species recorded for the NT with 15 in the DR [McGillivray, 1993]. A number of species are used for a variety of purposes by Aboriginal people. The seeds of *G. decurrens* and *G. heliosperma* are eaten raw. Nectar from many species is eaten. Some species such as *G. dryandri* have medicinal uses. Species with caustic fruits such as *G. dimidiata* are used to produce tribal skin markings (Levitt, 1981; Wightman *et al.*, 1992a,b)

- |                                                                                                                             |    |                           |
|-----------------------------------------------------------------------------------------------------------------------------|----|---------------------------|
| 1. Leaves dentate with spinose lobes .....                                                                                  | 2  |                           |
| 1. Leaves deeply pinnately or bipinnately lobed usually to midrib or entire .....                                           | 3  |                           |
| 2. Flowers red, <8 mm long; perianth inconspicuously hairy inside .....                                                     |    | <b>G. longicuspis</b>     |
| 2. Flowers white or creamy yellow to greenish yellow, >10 mm long; perianth with conspicuous stiff white hairs inside ..... |    | <b>G. angulata</b>        |
| 3. Leaves entire .....                                                                                                      | 4  |                           |
| 3. Leaves deeply lobed usually to midrib or with odd entire leaves .....                                                    | 11 |                           |
| 4. Leaf venation strongly pinnate and reticulate with marked intramarginal vein .....                                       | 5  |                           |
| 4. Venation obscure or $\pm$ parallel without intramarginal vein .....                                                      | 6  |                           |
| 5. Prostrate shrub .....                                                                                                    |    | <b>G. goodii</b>          |
|                                                                                                                             |    | subsp. <b>goodii</b>      |
| 5. Erect shrub .....                                                                                                        |    | <b>G. goodii</b>          |
|                                                                                                                             |    | subsp. <b>pluricaulis</b> |
| 6. Inflorescence <60 mm long, lateral branches recurved; flowers yellow-orange to reddish .....                             |    | <b>G. refracta</b>        |

- |                                                                                                                |                                               |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 6. Inflorescence >60 mm long, lateral branches spreading;<br>flowers white to cream .....                      | 7                                             |
| 7. Leaves linear or filiform, <6 mm wide .....                                                                 | 8                                             |
| 7. Leaves not linear, >6 mm wide .....                                                                         | 9                                             |
| 8. Leaf venation obscure; inflorescence to 500 mm long .....                                                   | <i>G. pyramidalis</i>                         |
| 8. Leaf venation conspicuous; inflorescence to 140 mm long .....                                               | <i>G. parallela</i>                           |
| 9. Plants glabrous .....                                                                                       | <i>G. dimidiata</i>                           |
| 9. Plants hairy at least on branchlets .....                                                                   | 10                                            |
| 10. Young leaves and branchlets usually glandular hairy; leaves straight .....                                 | <i>G. myosodes</i>                            |
| 10. Young leaves and branchlets eglandular; leaves falcate .....                                               | <i>G. mimosoides</i>                          |
| 11. Leaves <55 mm long, rigid, spinose .....                                                                   | <i>G. benthamiana</i>                         |
| 11. Leaves >55 mm long, flaccid, not spinose .....                                                             | 12                                            |
| 12. Inflorescence <60 mm long with branches recurved .....                                                     | <i>G. refracta</i>                            |
| 12. Inflorescence >60 mm long, if branched then branches spreading .....                                       | 13                                            |
| 13. Inflorescence unbranched .....                                                                             | 14                                            |
| 13. Inflorescence branched .....                                                                               | 15                                            |
| 14. Low prostrate shrub; flowers green maturing yellow .....                                                   | <i>G. formosa</i>                             |
| 14. Small tree; flowers bright orange .....                                                                    | <i>G. pteridifolia</i>                        |
| 15. Flowers white to creamy yellow .....                                                                       | 16                                            |
| 15. Flowers pink to red .....                                                                                  | 17                                            |
| 16. Leaf venation obscure; inflorescence to 500 mm long .....                                                  | <i>G. pyramidalis</i>                         |
| 16. Leaf venation conspicuous; inflorescence to 140 mm long .....                                              | <i>G. parallela</i>                           |
| 17. Sparse shrub; leaf lobes linear, <4 mm wide .....                                                          | 18                                            |
| 17. Small tree; leaf lobes not linear, >6 mm wide .....                                                        | 19                                            |
| 18. Flowers and fruit glandular hairy; leaves with 14-26 pairs of lobes;<br>lobes filiform, c. 1 mm wide ..... | <i>G. dryandri</i><br>subsp. <i>dasycarpa</i> |
| 18. Flowers and fruit glabrous; leaves with 3-16 pairs of lobes;<br>lobes linear, 1.3-4 mm wide .....          | <i>G. dryandri</i><br>subsp. <i>dryandri</i>  |
| 19. Leaves pinnately lobed, discolorous; lobes 10-45 mm wide .....                                             | <i>G. decurrens</i>                           |
| 19. Leaves mostly bipinnately lobed, concolorous; lobes 6-14 mm wide .....                                     | <i>G. heliosperma</i>                         |

### *G. angulata* R.Br.

*Shrub* to 2 m. Indumentum on branchlets, leaves and peduncle of very fine appressed, ferruginous becoming silvery, simple hairs. Petiole 8-10 mm long. *Leaf blades* grey-green, oblong to elliptic, (35)50-110 mm long, 24-40 mm wide, L/W 1.9-3.2, coarsely dentate; *lobes* spinose. *Inflorescence* axillary, mostly unbranched, 30-55 mm long. *Perianth* white or creamy yellow to greenish yellow, glabrous outside, dense, stiff, white patent hairs on inside, separating into 4 free segments. *Ovary* stipitate, glabrous; style pale green, glabrous, pollen presenter oblique,  $\pm$  elliptic. *Follicle* asymmetric-ellipsoid, 10-13 mm

long, glabrous. *Seed* 7.5-10 mm long. *Flowering* and *fruiting*: most months. Fig. 35

Restricted to the NT and eastern Kimberley. Occurs from Cobourg Peninsula and western Arnhem Land, disjunctly to the VRD. Not recorded in the DR but commonly cultivated. There is a closely related yellow flowered species, *G. aurea* P. Olde & N. Marriott, with longer inflorescences from the sandstone in Kakadu. This is also in cultivation. Another closely related species, *G. brevis* P. Olde & N. Marriott, which differs in having  $\pm$  entire leaves, occurs in the southern part of Kakadu National Park.

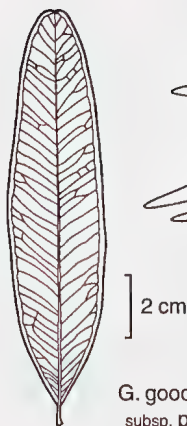
**Banksia**



*B. dentata*

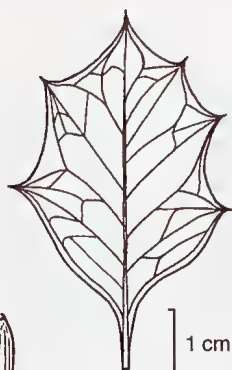


*G. decurrens*

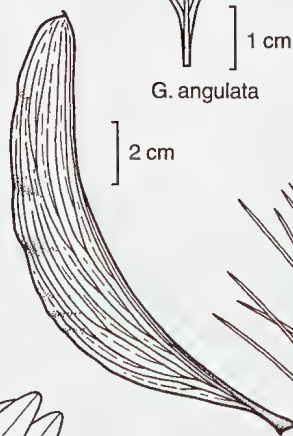


*G. goodii*  
subsp. *pluricaulis*

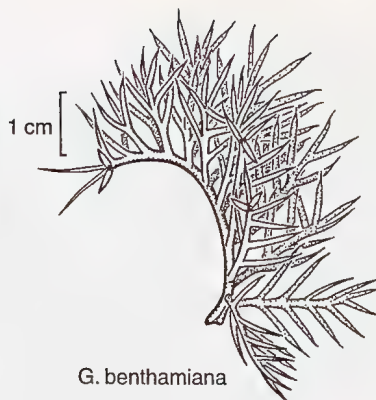
**Grevillea**



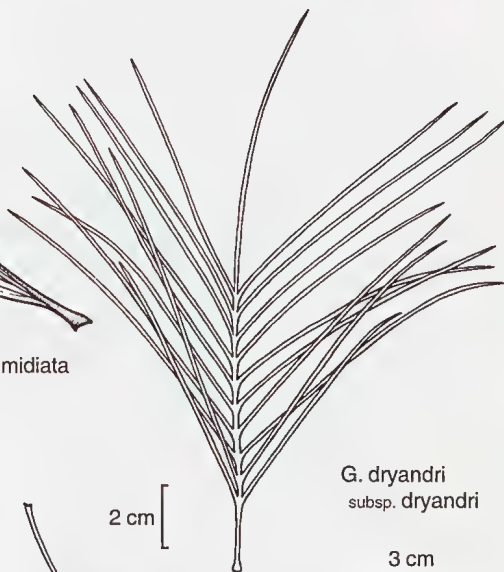
*G. angulata*



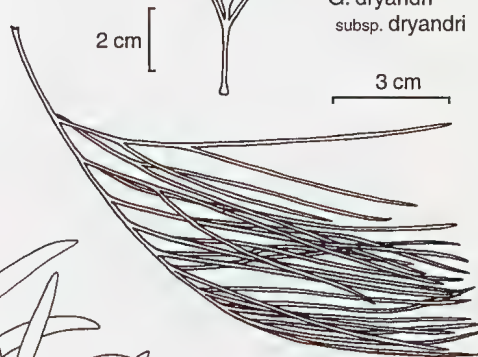
*G. dimidiata*



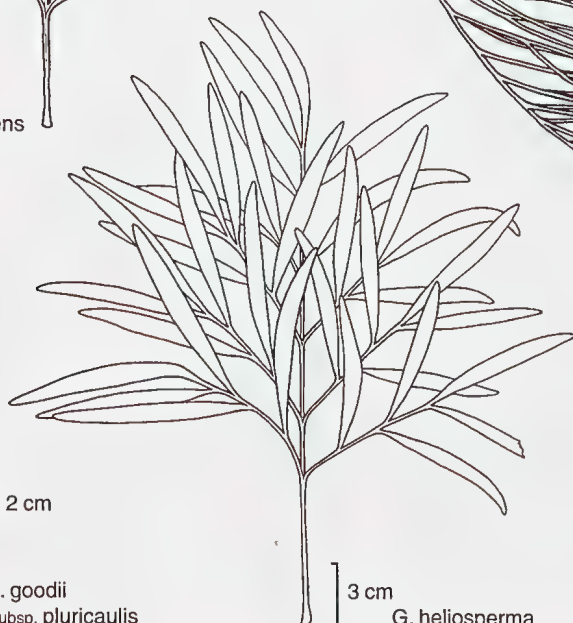
*G. benthamiana*



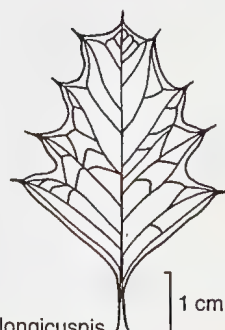
*G. dryandri*  
subsp. *dryandri*



*G. formosa*



*G. heliosperma*



*G. longicuspis*



**G. benthamiana** McGillivray

*Shrub* or small tree to 4 m. Indumentum on branchlets and leaves of dense, medifixed, glandular, silvery hairs, occasionally also with septate glandular hairs. Petiole 5-7 mm long. *Leaf blades* grey-green, imbricate, recurved, ovate to deltoid or oblong in outline, 30-55 mm long, 20-65 mm wide, L/W 0.86-1.5, deeply bipinnately lobed; *lobes* linear, spinose. *Inflorescence* axillary or terminal, simple or branched, to 250 mm long. Pedicel, perianth, and style glandular hairy. *Perianth* pink becoming deep red to almost black, inner surface papillose and hirsute with simple hairs; separating into 2 free segments. *Ovary* stipitate, glabrous; style red to pink, pollen presenter oblique, only slightly wider than style. *Follicle* asymmetric-ellipsoid, 14-20 mm long, glabrous. *Seed* c. 13 mm long. *Flowering* and fruiting: Apr - Dec. Fig. 35

A rare NT endemic restricted to old plateaus and escarpments of the Daly River basin. On rocky slopes in open woodland.

**G. decurrens** Ewart

Small *tree* to 4 m. Indumentum on branchlets, leaves and inflorescence of dense, medifixed, ferruginous becoming hyaline hairs, leaves glabrescent. Petiole 70-110 mm long. *Leaf blades* grey-green, discolorous, 170-330 mm long, 1-pinnate with 4-6 pairs of lobes, dissected to midrib; *lobes* narrowly lanceolate to narrowly elliptic, 75-160 mm long, 10-45 mm wide, L/W 3.5-7.5, venation conspicuous. *Inflorescence* axillary, branched, to 230 mm long. *Perianth* pink, glaucous, glabrous outside, inside hirsute at base, deciduous in 2 parts. *Ovary* stipitate, glaucous, glabrous; style pink, pollen presenter oblique, elliptic. *Follicle* orbicular, 28-35 mm long, glabrous, glaucous, valves thickly woody. *Seed* orbicular, 23-25 mm diam. with wing to 10 mm broad. *Flowering*: Nov - Mar; fruiting: June - Sept. Fig. 35

Widespread from the Gulf to the Kimberley; common in the DR on skeletal soils in woodland. This species has been treated as a synonym of *G. heliosperma* by McGillivray (1993).

**G. dimidiata** F.Muell.

Small *tree* to 5 m, glabrous, sometimes glaucous. Petiole 15-40 mm long. *Leaf blades* grey-green, curved, dimidiate, broadest at or below middle, 175-340 mm long, 18-75 mm wide, L/W 3.3-10, coriaceous, entire, with obscure fine parallel veins. *Inflorescence* terminal, openly branched, to 420 mm long. *Perianth* creamy yellow; separating into 4 free

segments. *Ovary* stipitate; style cream, pollen presenter conical. *Follicle* asymmetric-ellipsoid, 14-20 mm long, covered with caustic sticky resin. *Seed* not seen. *Flowering*: June - Sept; fruiting: Sept - Oct. Fig. 35

From Gove to the Kimberley; rare in the DR where known from the Douglas River area. Occurs in open woodland and shrublands.

**G. dryandri** R.Br. subsp. *dryandri*

Sparse *shrub* or subshrub to 1 m. Indumentum of fine medifixed hairs on branchlets and leaves, otherwise glabrous. Petiole 15-55 mm long. *Leaf blades* 160-200 mm long, 1-pinnate with 3-16 pairs of lobes, dissected to midrib; *lobes* linear, 68-180 mm long, 1.3-4 mm wide, margin recurved. *Inflorescence* terminal, branched, secund, to 550 mm long. *Perianth* red, rarely paler cream to white, with short fine hairs inside; separating into 4 free segments. *Ovary* stipitate; style red or paler, pollen presenter large, oblique. *Follicle* asymmetric-ellipsoid, c. 10 mm long, thinly woody, glabrous, sticky resinous. *Seed* not seen. *Flowering* and fruiting: Mar - Oct. Fig. 35

From Qld across the Top End and into the Kimberley; common in the DR where found in open woodland on laterite.

**G. dryandri** R.Br. subsp. *dasycarpa* McGillivray

Sparse *shrub* to 2 m. *Inflorescence* axis, pedicels, perianth, ovary and base of style with septate glandular hairs. Petiole 20-35 mm long. *Leaf blades* 130-185 mm long, 1-pinnate with 14-26 pairs of lobes; *lobes* filiform, to 105 mm long, c. 1 mm wide. *Follicle* elongate ellipsoid, 12-15 mm long, highly viscid. *Seed* narrowly oblong, c. 9 mm long, folded and furrowed, wing vestigial, protruding at one end and modified into an elaiosome. *Flowering* and fruiting: Mar - July. Fig. 34

Associated with sandstone from Arnhem Land to Katherine Gorge. Uncommon in the DR where known from sandstone formations south of Adelaide River township. Differing from subsp. *dryandri* only by the above characters.

**G. formosa** McGillivray

Sprawling *shrub*, branches trailing to several metres long. Indumentum on branchlets, leaves, inflorescence, pedicels and outside of perianth of closely sericeous medifixed hairs. Petiole 7-15 mm long. *Leaf blades* grey-green, 45-150 mm long, 1-pinnate with 8-11 pairs of lobes, dissected to midrib,

sometimes lower lobes further divided 1-3 times; *lobes* filiform, 45-80 mm long, c. 1 mm wide. *Inflorescence* terminal, unbranched, secund, to 300 mm long. *Perianth* green maturing yellow, glabrous inside, separating into 4 free segments. *Ovary* sessile, hirsute; style green turning yellow, pollen presenter lateral. *Follicle* asymmetric narrow-ovoid, 14-15 mm long, ferruginous with septate glandular hairs and unequal 2-armed hairs. *Seed* ellipsoid to oblong, 9-11 mm long, flattened, wing vestigial and modified into an elaiosome, protruding at one end. *Flowering*: Jan - Apr; fruiting: Feb - May. Fig. 35

Endemic to the western Arnhem Land plateau but now widely cultivated in Darwin.

#### **G. goodii** R.Br. subsp. *goodii*

Prostrate *shrub*, annual stems from perennial rootstock. Indumentum on branches, leaves, inflorescence, outside of perianth of fine medifixed, ferruginous or hyaline hairs, minute collectors on underside of leaf. Petiole 4-7 mm long. *Leaf blades* entire, lanceolate, elliptic, obcordate, 48-175 mm long, 22-50 mm wide, L/W 1.4-7, venation conspicuous with a prominent intramarginal vein. *Inflorescence* axillary, rarely terminal, unbranched, secund, to 270 mm long. *Perianth* greenish to red, hairy inside; deciduous in 2 parts. *Ovary* shortly stipitate, white hirsute; style pink, sparsely hairy for lower 2/3, pollen presenter lateral. *Follicle* ellipsoid, 15-17 mm long, thinly woody. *Seed* ellipsoid, c. 10 mm long, wing narrow,  $\pm$  fleshy and protruding at one end. *Flowering*: Jan - Apr; fruiting: May - June.

An NT endemic; widespread in the DR on sandy soils in *Eucalyptus miniata* open forest.

#### **G. goodii** R.Br. subsp. *pluricaulis* McGillivray

Erect multistemmed *shrub* to 3 m. Petiole 5-15 mm long. *Leaf blades* entire, lanceolate, narrowly elliptic to oblong, 130-300 mm long, 27-85 mm wide, L/W 2.5-7, apex acute to emarginate. *Inflorescence* to 150 mm long. *Perianth* pale greenish yellow to orange. *Ovary* white sericeous; style orange, pink to bright red, hairy. *Flowering*: all year; fruiting: Apr - June. Fig. 35

An NT endemic from Melville Is. to Port Keats, Darwin R. area and Litchfield NP. Differing from subsp. *goodii* by the above characters.

#### **G. heliosperma** R.Br.

Small *tree* to 7 m. Indumentum on branchlets and leaves of ferruginous, medifixed hairs, leaf blades glabrescent or glabrous. Petiole 50-115 mm long. *Leaf*

*blades* concolorous, mostly bipinnate, 4-6 pairs of lobes, dissected to midrib, terminal lobes simple, rachis to 290 mm long; *lobes* narrowly lanceolate to narrowly elliptic, 55-130 mm long, 6-14 mm wide, L/W (6)9-16. *Inflorescences* axillary or rarely terminal, branched, to 150 mm long. *Perianth* red, glaucous, hairy inside at base; deciduous in 4 parts. *Ovary* stipitate, glabrous; style red, pollen presenter lateral to oblique. *Follicle* orbicular, 20-35 mm diam., glabrous, glaucous, valves thickly woody. *Seed* orbicular, c. 15 mm diam. with wing to 4 mm broad. *Flowering*: May - July; fruiting: July - Oct. Fig. 35

From western Qld to the Kimberley. Common in the DR on sandy soils or sandstone in Eucalypt forest. Close to *G. decurrens* with which it hybridises. See notes for *G. decurrens*.

#### **G. longicuspis** McGillivray

*Shrub* to 1 m. Indumentum on branchlets, leaves and peduncle of medifixed and septate glandular hairs. Petiole 5-14 mm long. *Leaf blades* ovate, 35-65 mm long, 25-60 mm wide, L/W 1-1.7, coarsely dentate; *lobes* spinose. *Inflorescence* axillary or terminal on short lateral branchlets, unbranched, to 40 mm long. *Perianth* red, hairy inside; separating into 4 free segments. *Ovary* stipitate, glabrous; style glabrous, yellowish, pollen presenter lateral. *Follicle* oblong, 12-14 mm long, glabrous. *Seed* not seen. *Flowering*: Aug - Dec; fruiting: Sept - Apr. Fig. 35

A DR endemic, restricted to the Manton Dam area, Berry Springs and Wagait. On gravelly soils in open woodland.

#### **G. mimosoides** R.Br.

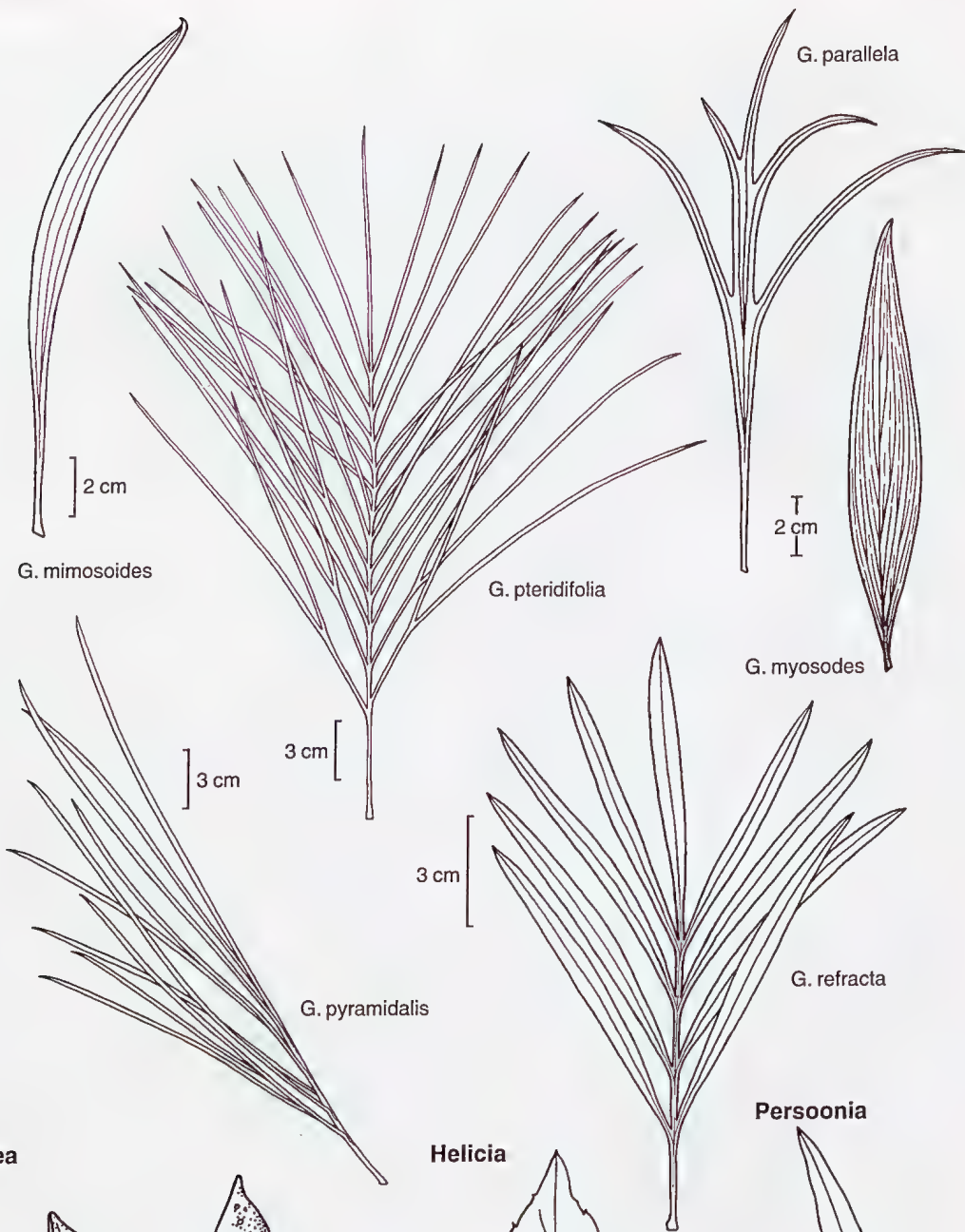
Small *tree* to 8 m. Bark thick, furrowed, grey. Indumentum of dense, silvery, medifixed hairs on young branchlets and petioles. *Leaves* sessile; blades grey-green, falcate, 120-290 mm long, 6-20(30) mm wide, L/W 8-25, coriaceous, entire, with obscure fine parallel veins. *Inflorescence* terminal, branched, to 300 mm long. *Perianth* cream, papillose inside; separating into 4 free segments. *Ovary* stipitate, glabrous; style cream, glabrous, pollen presenter conical. *Follicle*  $\pm$  orbicular, 14-22 mm diam., woody, covered with caustic sticky resin. *Seed* not seen. *Flowering*: June - Sept; fruiting: mostly Sept - Nov, old fruits persisting. Fig. 36

From western Qld to the Kimberley. Scattered in the DR in open forest or woodland.

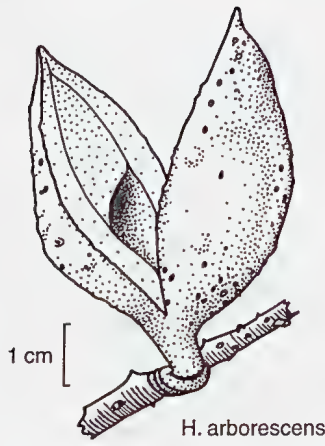
#### **G. myosodes** McGillivray

*Shrub* to 1.6 m. Indumentum of branchlets and

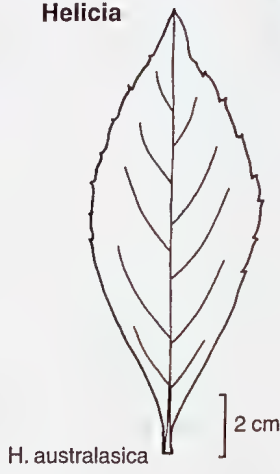
**Grevillea**



**Hakea**



**Helicia**



**Persoonia**



**Fig. 36**



leaves of ferruginous medifixed hairs and septate glandular hairs, leaves sometimes lacking glandular hairs. *Leaves* sessile or shortly petiolate; blades narrowly elliptic to elliptic, 90-170 mm long, 11-35 mm wide, L/W (2.5)6.5-9.5, coriaceous, entire, obscurely veined. *Inflorescence* terminal, branched, to 140 mm long. *Perianth* creamy yellow; separating into 4 free segments. *Ovary* shortly stipitate, glabrous; style cream to yellow, pollen presenter conical. *Follicle* oblong to  $\pm$  orbicular, 19-24 mm long. *Seed* oblong to orbicular, c. 18 mm long, 14 mm wide, wing c. 4 mm broad. *Flowering*: Apr; *fruiting*: Apr - May. Fig. 36

Disjunct from western Arnhem Land to Litchfield NP and the Kimberley. Rare in the DR; in open Eucalypt forest on lateritic and sandstone plateaus.

### **G. parallela** Knight

Small *tree* to 6 m. Bark black, rough, furrowed. Indumentum on branchlets and leaves of medifixed hairs, rarely in dry country the inflorescence and flowers sericeous. *Leaves* entire or deeply 2-7-lobed, to 350 mm long, discolorous, longitudinally veined, margins recurved; *lobes* linear, to 115 mm long, 1.5-9 mm wide. *Inflorescence* terminal, branched, to 140 mm long. *Perianth* white to pale yellow, usually glabrous; separating into 4 free segments. *Ovary* stipitate; style cream, pollen presenter oblique. *Follicle* ellipsoid, 20-22 mm long, woody. *Seed* orbicular, c. 17 mm diam., wing c. 4 mm broad. *Flowering*: Apr - Oct; *fruiting*: July - Dec. Fig. 34, 36

From Qld to the Kimberley; rare in the DR where known only from Melville Is. and the Marrakai area. Typically in seasonally wet areas on a variety of soil types.

### **G. pteridifolia** Knight

Small *tree* to 6 m. Bark dark grey, finely fissured. Indumentum on branchlets, leaves, inflorescence and perianth of dense medifixed hairs. Petiole 45-90 mm long. *Leaf blades* silvery, discolorous, to 40 mm long, 1-pinnate with 7-11 pairs of lobes, dissected to midrib, sometimes lower lobes further divided 1-2 times; *lobes* linear, to 180 mm long, 1.5-4 mm wide, margin recurved. *Inflorescence* axillary or terminal on short lateral branches, unbranched, appearing 1-sided at anthesis, to 230 mm long. *Perianth* orange, glabrous inside; separating into 4 free segments. *Ovary* sessile, hirsute; style orange, glabrous, pollen presenter oblique. *Follicle* asymmetrically oblong, 14-20 mm long, densely tomentose with septate

glandular hairs. *Seed* narrowly oblong, 12-17 mm long, wing c. 2.5 mm broad. *Flowering*: May - Aug, later in eastern Arnhem Land; *fruiting*: June - Oct. Fig. 36

Widespread from Qld to the Kimberley and common in the DR, especially on seasonally wet sandy areas.

### **G. pyramidalis** A.Cunn. ex R.Br.

Small *tree* to 7 m. Indumentum of fine, ferruginous or silvery, medifixed hairs on branchlets and leaves, otherwise glabrous. Petiole 50-140 mm long. *Leaf blades* 270-500 mm long, entire or 1-pinnate with 4-7 pairs of lobes, dissected to midrib, sometimes lower lobes further divided 1-3 times; *lobes* linear, to 390 mm long, 1-4(8) mm wide. *Inflorescence* terminal, branched, to 500 mm long. *Perianth* white to cream, papillose inside; separating into 4 free segments. *Ovary* stipitate; style cream, pollen presenter conical. *Follicle* ellipsoid to orbicular, 17-24 mm long, thinly woody, viscid, drying black. *Seed* not seen. *Flowering*: May - Oct; *fruiting*: Sept - Jan. Fig. 36

From the NT and the Kimberley; rare in the DR with records from the Daly River and Mt Bunday; more common in drier country of the Gulf and the VRD. Occurs in open woodland. Closely related to *G. erythroclada* W. Fitzg. which occurs from the Gulf to the Kimberley.

### **G. refracta** R.Br.

*Shrub* to 5 m. Indumentum on branchlets, leaves, inflorescence and perianth of dense silvery or ferruginous, medifixed hairs. Petiole 20-40 mm long. *Leaf blades* discolorous, to 170 mm long, entire or 1-pinnate with 1-10 pairs of lobes, deeply dissected to midrib; *lobes* narrowly elliptic to oblanceolate, 50-170 mm long, 4-21 mm wide. *Inflorescence* terminal, branched, to 60 mm long, branches recurved. *Perianth* yellow-orange to red, hairy inside; separating into 4 free segments. *Ovary* stipitate, glabrous; style yellow, glabrous, pollen presenter oblique to lateral. *Follicle*  $\pm$  orbicular to elliptic, 20-30 mm long, woody. *Seeds* elliptic, c. 19 mm long, wing c. 4 mm broad. *Flowering* and *fruiting*: throughout the year. Fig. 36

Widespread across the NT to the Kimberley. Rare in the DR in southern parts around Litchfield; on sandstone or sandy soils.

## HAKEA Schrader

An endemic Australian genus of c. 140 species; 14 species in the NT but only 1 in the DR.

### **H. arborescens** R.Br.

Small *tree* to 8 m. Bark rough, grey, fissured. Indumentum of branchlets, young leaves, inflorescence and perianth densely sericeous with ferruginous to hyaline medifixed hairs. *Leaves* sessile; blades entire, linear to narrowly oblanceolate or narrowly elliptic, 50-185 mm long, 3-11 mm wide, L/W 9.5-43, coriaceous, venation parallel but obscure. *Inflorescence* axillary, unbranched, to 30(50) mm long, clustered in heads. *Perianth* free, silvery or ferruginous. Hypogynous glands fused, horseshoe-shaped. *Ovary* shortly stipitate, glabrous; style hairy

in lower half or glabrous, pollen presenter conical, terminal. *Fruit* a follicle, ellipsoid, 28-58 mm long, 14-26 mm wide, thickly woody, smooth to slightly verrucose, beaked. *Seeds* 2, obovoid, 10-15 mm long, black, wing 15-18 mm long, membranous. *Flowering*: Jan - July; fruiting: persisting throughout the year. Fig. 36

Widespread from Qld to the Kimberley and extending into the arid zone. Uncommon in the DR where known from the Elizabeth R. area and Howard Springs. Associated with coastal dunes or inland on alkaline soils.

## HELICIA Lour.

A genus of c. 90 species from Asia to Malesia and Australia. About 8 species in Australia with 1 in the NT. [Foreman, 1983]

### **H. australasica** F.Muell.

Small *tree* to 10(15) m. Bark smooth and pale. Indumentum of branchlets, inflorescence and pedicels of small ferruginous medifixed hairs. Petiole 6-17 mm long. *Leaf blades*; juvenile leaves large and coarsely dentate; adult leaves discolorous, narrowly elliptic, elliptic to oblanceolate, 100-210 mm long, 26-80 mm wide, L/W 2.1-4.7, strongly reticulately veined, entire or dentate. *Inflorescence* axillary, unbranched,

to 190 mm long. Pedicels fused at base. *Flowers* in pairs, actinomorphic. *Perianth* free, white to cream, ciliate. Hypogynous glands free. *Ovary* sessile, hirsute with ferruginous hairs; style glabrous, pollen presenter erect. *Fruit* fleshy, dark purple to black, ellipsoid, 10-15 mm long. *Seeds* 2. *Flowering*: July - Nov; fruiting: Jan - Mar. Fig. 36

Qld and the NT. Common in the DR in perennially wet rainforest. Ripe fruit are edible.

## PERSOONIA Smith

A genus of c. 90 species; endemic to Australia; 1 species in the NT. The genus *Pycnonia* was described by Johnson & Briggs (1975) to accommodate 6 species from SW Australia and the widespread northern species *Persoonia falcata*; however this new genus has not been taken up.

### **P. falcata** R.Br.

Small *tree* to 8 m. Bark rough, grey. Young branchlets with dense silvery simple hairs. *Leaves* sessile; blades subglaucous, straight or falcate, linear to oblanceolate to broadly oblanceolate, 95-280 mm long, 8-55 mm wide, L/W 3.5-34, coriaceous, venation obscure except for midrib, base attenuate, entire. *Inflorescence* axillary or terminal, often growing out into a leafy shoot, unbranched, to 220

mm long, flowers subtended by bracts or leaves. *Flowers* zygomorphic. *Perianth* free, yellow. Hypogynous glands 4, free. *Ovary* sessile, glabrous; style short, curved, glabrous, truncate. *Fruit* a fleshy drupe, yellow-green, ellipsoid, 15-20 mm long. *Flowering*: June - Oct; fruiting: Oct - Jan. Fig. 36

**Milky Plum**

Widespread across northern Australia in open woodland; common in the DR. Fruits are edible.

STENOCARPUS R.Br.

Trees. Young growth rusty pubescent. Inflorescences terminal or in upper axils, umbellate. Flowers zygomorphic. Hypogynous glands united in a horseshoe-shaped nectary. Ovary stipitate; ovules numerous; style long and dilated apically into an oblique pollen presenter. Fruit a follicle; seeds with an outer membranous wing folded around the inner wing.

A genus of 25 species from Malaysia, New Caledonia to Australia; 8 species in Australia; 3 in the NT, 2 in the DR. All NT species are described here.

1. Leaves discolorous, glossy above .....

1. Leaves concolorous, dull above .....

2. Perianth yellow, 4-5 mm long .....

2. Perianth white, 8-15 mm long .....
- S. 'Top End'

2

S. cunninghamii

S. acacioides

S. acacioides F.Muell.

S. cunninghamii R.Br., misapplied name

Tree to 12 m; bark black, fissured. New buds rusty tomentose; plants otherwise glabrous. Petioles 5-20 mm long. Leaf blades concolorous, dull, coriaceous; juveniles entire, deltoid or ovate, 73-120 mm long, 57-111 mm wide, L/W 1-1.5, grading into adult leaves; adults elliptic or narrowly elliptic, 45-115 mm long, 7-30 mm wide, L/W 3-8, main longitudinal veins 4-8, secondary venation obscure, bases long-attenuate, apices acute or obtuse. Umbels of 19-22 flowers; peduncles 7-35 mm long; pedicels 6-10 mm long. Perianth white, 8-15 mm long. Fruit woody, linear, 55-150 mm long. Seeds not seen. Flowering: Apr - Oct; fruiting: Nov - May. Fig. 37

Distributed from the Kimberley eastward across the Top End north of 16° S. Of scattered occurrence

in the DR, usually on skeletal soils in Eucalypt woodland; rarely in monsoon thickets. Typically reproducing by suckers and not often seen as adults.

S. cunninghamii R.Br.

Tree to 10 m; bark dark grey, flaky and rough. New growth rusty tomentose, soon becoming glabrous. Petioles 4-7 mm long. Leaf blades concolorous, dull, coriaceous; juveniles elliptic or ovate in outline, simply lobed to deeply bipinnately lobed, lobes linear; adults oblanceolate, narrowly oblanceolate or narrowly elliptic, straight or falcate, 25-110 mm long, 4-18 mm wide, L/W 3-12, venation faint with 3-5 longitudinal veins, base attenuate, apex acute or obtuse, mucronate. Umbels of 14-21 flowers; peduncles 3-19 mm long, pedicels 4-5 mm

Stenocarpus

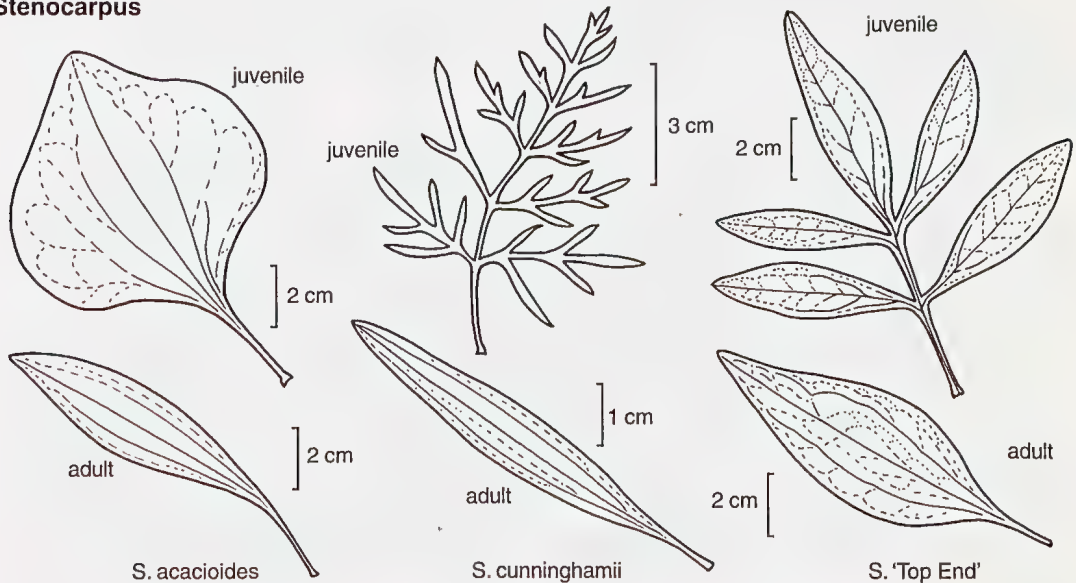


Fig. 37



long. *Perianth* yellow, 4-5 mm long. *Fruit* woody, linear, 40-60 mm long; seeds not seen. *Flowering*: Mar - May. Fig. 37

Coastal Kimberley to near Port Keats. Restricted in the NT to sandstone areas from Keep R. to the Macadam Range; found only in narrow sandstone gorges.

**S. 'Top End'**

*Tree* to 20 m; bark dark brown, rough; blaze pink. Young growth rusty or rusty and grey sericeous, often persisting on the leaves and branchlets. Petioles 2-20(35) mm long. *Leaf blades* discolorous, shiny above, dull below; *juveniles* pinnately 3-7-

lobed, lanceolate or elliptic; *adults* entire, elliptic or broadly elliptic or broadly lanceolate, 55-150 mm long, 17-70 mm wide, L/W 2-5, with 3-5 major longitudinal veins, base attenuate, apex obtuse or acute. *Umbels* of 40-50 flowers, rusty or grey tomentose throughout; peduncles 12-27 mm long, pedicels 5-12 mm long. *Perianth* cream, 7-9 mm long. *Fruit* woody, linear, 30-80 mm long. *Seeds* not seen. *Flowering*: Mar - May; fruiting: Aug - Oct. Fig. 37

A monsoon thicket species distributed from Melville Is. to Gove Peninsula, usually on laterite or sandstone. The species is similar in adult foliage to *S. salignus* R.Br. of Qld and NSW.

## HALORAGACEAE

Submerged to emergent aquatic or amphibious herbs, sometimes terrestrial. Leaves alternate, opposite or whorled, tending to be pinnately veined, stipules absent. Flowers small, solitary and axillary or in terminal spikes, bisexual or unisexual, actinomorphic, 4-merous, bracteoles present. Calyx persistent in fruit, shorter than the petals, the latter commonly deciduous or sometimes absent. Petals hooded. Stamens 8, in 2 whorls. Ovary inferior, of 2-4 united carpels with 4 distinct feathery styles; ovules 1 per locule. Fruit an indehiscent nut or schizocarp splitting into 4 mericarps, 1-4 locular, variously ornamented with wings, ribs or tubercules.

A family of c. 8 genera and 100 species, widely distributed in the world but best developed in the southern hemisphere, especially Australia. Represented in the NT by 4 genera, with 2 in the DR. [Orchard, 1990]

- |                                                                                                |                     |
|------------------------------------------------------------------------------------------------|---------------------|
| 1. Plants terrestrial; fruit 1-seeded; leaves >2 mm wide .....                                 | <b>Gonocarpus</b>   |
| 1. Plants aquatic or littoral; fruit 2- or 4-seeded; emergent entire leaves <1.5 mm wide ..... | <b>Muriophyllum</b> |

## GONOCARPUS Thunb.

Annual or perennial herbs or subshrubs. Stems 4-ribbed, hairy to varying degrees. Leaves decussate, sessile or shortly petiolate, margin serrate, scabrous, apex acute. Inflorescences of spikes or leafy panicles, flowers borne singly in the axils of alternate, leaf-like primary bracts. Pedicels short. Petals slightly keeled with stiff hairs. Stamens as long as petals. Ovary similar to fruit; styles pink, clavate. Fruit 8-ribbed, surface finely papillose, sepals persistent, incompletely 4-locular with 1 (rarely 2) ovules per locule, but only 1 ovule maturing to occupy the entire fruit.

A genus of 41 species widespread in Australia and New Zealand, but also in Malesia and eastern Asia as far as Japan and Taiwan. In the NT 4 species are present, 2 of which are found in the DR.

- |                                                                                                                               |                       |
|-------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. Decumbent herb; leaves 1-6 mm wide; fruit globular, c. 1 mm long<br>with 1-2 oblique calli arising from the ribs .....     | <b>G. chinensis</b>   |
| 1. Erect subshrub; leaves 4-19 mm wide; fruit cylindrical, 1.5- 2 mm long<br>with 4 angular tubercules between the ribs ..... | <b>G. leptothecus</b> |

**G. chinensis** (Lour.) Orchard subsp. **chinensis**

A low spreading perennial *herb* up to 30 cm tall; stems decumbent. All vegetative parts with sparse adpressed hairs. *Leaves* sessile or with petioles to 1 mm long; blades linear to narrowly lanceolate, 8-22 mm long, 1-6 mm wide, base truncate to cordate. *Inflorescences* spicate, borne terminally and in the axils of the upper leaves; bracts narrow triangular to lanceolate, c. 1.5 mm long. Pedicels c. 0.2 mm long; bracteoles linear, 0.5-0.8 mm long. *Sepals* brown, narrow triangular, c. 0.8 mm long, glabrous, with a small median basal callus. *Petals* pink, 1.5-2 mm long. *Anthers* yellow. *Fruit* shortly pedicellate, silvery grey, sub-globular, c. 1 mm long, 8-ribbed, with 1-2 irregular calli arising obliquely from the ribs. Flowering and fruiting: Apr - Sept. Fig. 38

In Australia, found in the northern NT and Kimberley, also extending through Malaysia and southern China. Rare in the DR, where known only from one collection made near the Adelaide R. last century. Locally, this species grows in sandy soils in damp situations. Another taxon, *G. chinensis* subsp. *verrucosus* (Maiden & E.Betche) Orch. occurs along the east coast, and as an introduced weed in Hawaii.

**G. leptothecus** (F.Muell.) Orchard

An annual or perennial subshrub to 1 m tall, with erect stems. All vegetative parts scabrous with erect hairs. Petioles 0-4 mm long. *Leaf blades* concolorous, lanceolate, elliptic to narrow-elliptic or spatulate, 11-47 mm long, 4-19 mm wide. *Inflorescences* of terminal leafy panicles; bracts lanceolate to narrowly ovate, 2.5-4 mm long, 0.5-1 mm wide. Pedicels c. 1 mm long; bracteoles at base of pedicel, stramineous, c. 1 mm long, with glandular hairs borne on the irregular marginal teeth. *Sepals* green, broadly triangular, c. 0.8 mm long, glabrous. *Petals* pink to green, linear, c. 2.5 mm long. *Anthers* pink. *Fruit* pale brown, cylindrical, 1.5-2 mm long with 4, 3-5-angled tubercles between pairs of ribs. Flowering and fruiting: Feb - July (Nov). Fig. 38

Widespread and common north of 17°S latitude, from the Qld Gulf Region to the Kimberley. Uncommon in the DR where it is known from Melville Is., Pine Creek and the Litchfield area. Found growing in sandy-surfaced soils in a variety of habitats from swamps to rocky slopes and sandstone plateaus.

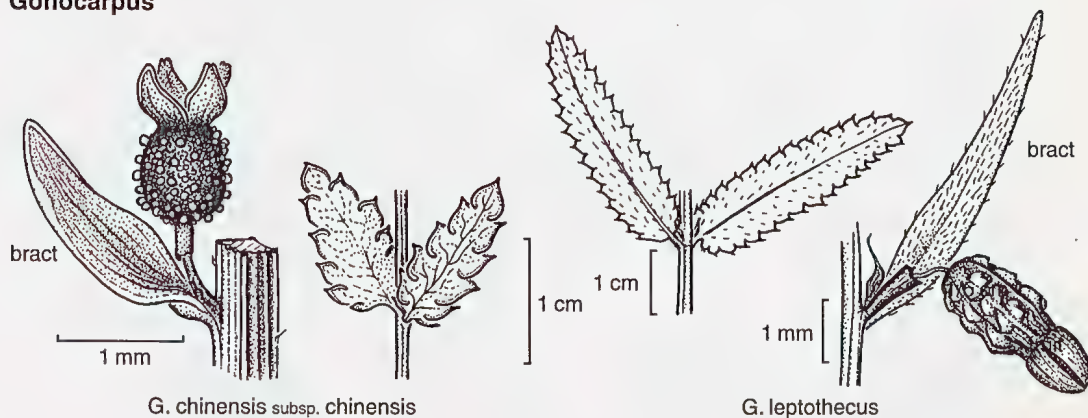
**Gonocarpus**

Fig. 38

**MYRIOPHYLLUM L.**

Annual or perennial emergent aquatic herbs affixed to sediments by roots from the lower nodes. Stems often reddish in emergent parts. All parts glabrous. Leaves dimorphic; submerged leaves pectinately divided, emergent leaves entire or serrate. Inflorescences simple. Flowers unisexual or bisexual, solitary in the axils of emergent leaves, sessile, sometimes one or both whorls absent. Petals pink. Ovary of 4 carpels; stigmas capitate, fimbriate. Fruit variously ornamented, splitting at maturity into 4, 1-seeded mericarps.

An almost cosmopolitan genus of c. 60 species, with a major centre of diversity in Australia. Six species are known from the NT, with 2 occurring in the DR. Often commonly known as Water Milfoil.

- 1. Emergent leaves toothed in upper half, intermediate leaves absent; flowers bisexual; mericarps flattened with longitudinal wings extending down the dorsal surface ..... **M. muricatum**
- 1. Emergent leaves entire, divided, intermediate leaves often present; monoecious with male flowers in upper axils and female below; mericarps cylindrical, tuberculate in lower half ..... **M. trachycarpum**

**M. muricatum** Orchard

*M. tuberculatum* Roxb., misapplied name

Stems c. 4 mm diam. with roots only at base. Submerged leaves in sometimes irregular whorls of 4-6, finely pectinate, 25-50(70) mm long, 20-40 mm wide with numerous filiform pinnae 6-25 mm long. Emergent leaves irregularly arranged to almost in whorls, linear to narrowly oblanceolate, 7-20 mm long, 1-1.5 mm wide, toothed in upper half, acute. Flowers bisexual, solitary in the axils of emergent leaves. Bracteoles brown, c. 1 mm long, linear. Sepals minute, orbicular. Petals thin, c. 2 mm long, persisting to early stages of fruit development. Anthers on a short filament about as long as the petals. Ovary 4-angled (ribbed), minute. Fruit globular, c. 2.5 mm long, square in cross-section with longitudinal wings extending down the dorsal surface of each mericarp, mericarps flattened semi-circular, each with a  $\pm$  inflated membranous exocarp which weathers to reveal the numerous short woody spines of the endocarp. Flowering and fruiting: Feb - Oct. Fig. 39

Found in the NT north of 13°S and also in subcoastal central and northern Qld. In the DR known from Fogg Dam and the Reynolds River. Grows in permanent billabongs and seasonally inundated swamps in water to 1 m deep. Closely related to the Indian species *M. tuberculatum* Roxb. to which collections from the NT had previously been referred.

**M. trachycarpum** F.Muell.

Stems often red in emergent parts, yellowish-green in submerged parts. Leaves irregularly arranged. Submerged leaves often appearing to be in whorls of 4-5 or scattered along the stem, pectinate, 10-25 mm long with numerous filiform pinnae to 17 mm long arranged irregularly along a slender rachis. Emergent leaves alternate, reddish, linear to oblanceolate, 2-12 mm long, 0.4-1.5 mm wide, entire, apex blunt with reddish gland. Transitional leaves present, serrate to pinnate, sometimes longer than emergent leaves. Flowers monoecious, solitary in the leaf axils; upper flowers male, lower female. Bracteoles linear, 0.6-0.7 mm long. Male flowers lacking sepals. Petals linear, becoming reflexed after anthesis, c. 2.5 mm long, persistent. Female flowers lacking sepals, petals and stamens. Ovary pink, cylindrical, c. 0.6 mm long; stigmas white. Mericarps reddish, cylindrical, c. 1 mm long, 1 mm diam., bases rounded, covered in the lower 2/3 with tubercles, with oblique slightly flared apices. Flowering and fruiting: Apr - July. Fig. 39

An Australian endemic, found in the Kimberley and the Top End of the NT. In the DR it is known from lagoons close to Darwin. Typically growing in shallow sandy creek channels associated with sandstone, but occasionally in lowland lagoons on sand or clay.

**Myriophyllum**

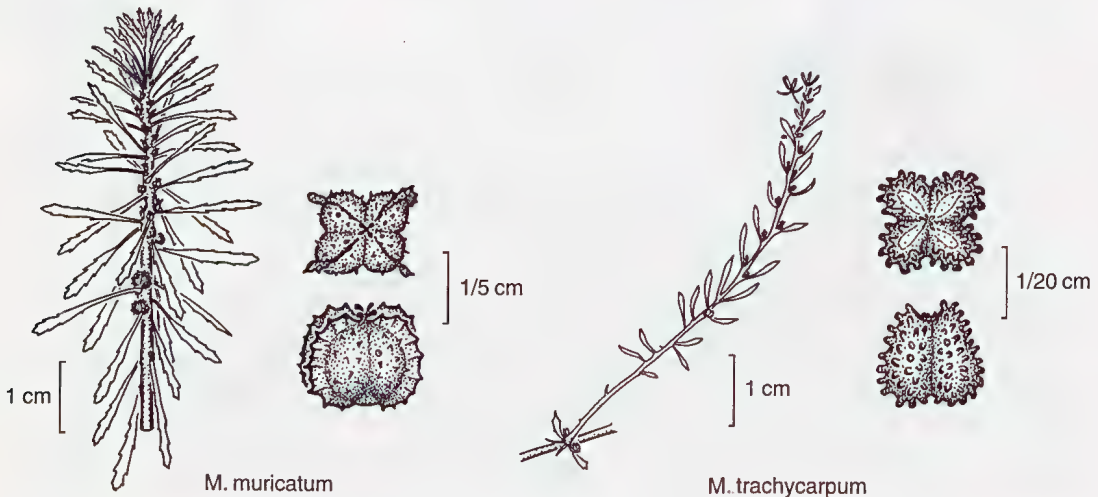


Fig. 39



SONNERATIACEAE

A small family of only 2 genera and c. 10 species; all native to the tropics of the Old World. Only *Sonneratia* in Australia and the NT.

SONNERATIA L.f.

Evergreen glabrous trees, with pneumatophores; branchlets quadrangular. Stipules evident on young growth as reddish swollen outgrowths, obscure on older growth. Leaves decussate, simple, entire, coriaceous, finely and obscurely pellucid dotted with larger scattered brown resinous dots, apex recurved and thickened. Inflorescence a bracteate terminal dichasium, usually 1-flowered at maturity. Flowers sessile or shortly pedicellate, large, actinomorphic, bisexual. Hypanthium cupular. Sepals 5-7, triangular, coriaceous, persistent in fruit. Petals equal in number to the sepals or wanting, linear. Stamens white, numerous in several series, inserted on rim of hypanthium; anthers versatile, reniform. Ovary superior, sessile, 10-20-locular; stigma capitate. Fruit a green depressed globular berry with leathery pericarp; hypanthium, calyx and style base persistent. Seeds numerous, embedded in firm flesh of fruit.

A genus of c. 6 species with 4 in Australia; 2 in the NT, both recorded for the DR. [Backer & van Steenis, 1951; Duke & Jackes 1987; Wightman, 1989; Hewson, 1990].

1. Leaves  $\pm$  sessile, lanceolate or elliptic, 2.7-4.8 times as long as wide;  
fruit wider than hypanthium .....

S. lanceolata
1. Leaves petiolate, broadest towards apex, 1-3 times as long as wide;  
fruit c. equal in width to hypanthium .....

S. alba

S. alba Smith

Broadly crowned tree to 8 m; bark cream to

brown, smooth with fine fissures or becoming platy; pneumatophores stout, blunt, to 25 cm high. Petioles 6-15 mm long. Leaf blades  $\pm$  orbicular,

Sonneratia

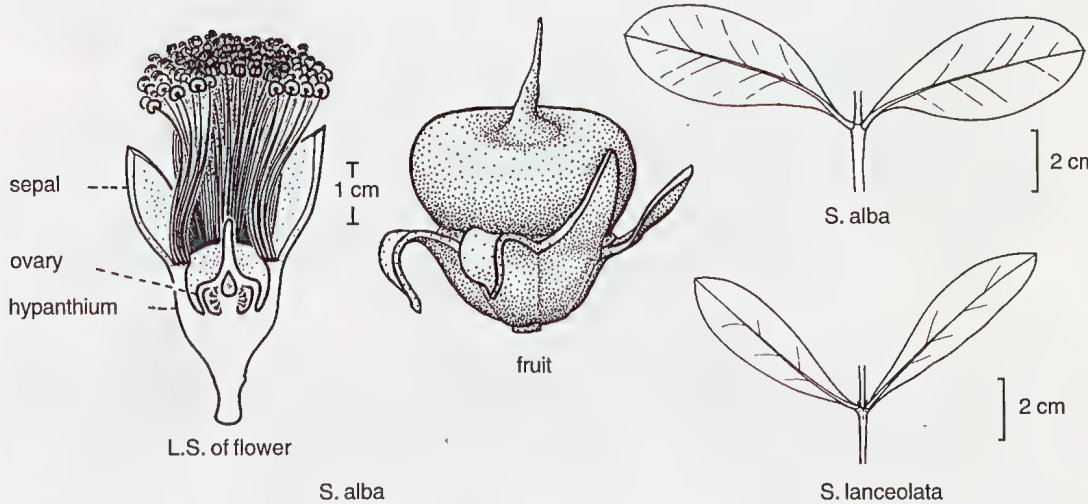


Fig. 40

obcordate, oblanceolate to broadly elliptic, 40-95 mm long, 18-80 mm wide, L/W 1-3, secondary venation not evident, base attenuate, apex acute, obtuse or emarginate. *Hypanthium* 13-18 mm long. *Sepals* 16-23 mm long. *Petals* caducous or absent, white throughout or red at base, similar to staminal filaments, c. 30 mm long. Stamens 35-40 mm long. Style 45-60 mm long. *Fruit* 26-36 mm long, 20-37 mm wide. *Flowering* and *fruiting*: most months. Fig. 40

Widespread from Africa to northern Australia; common in the DR. Typically on the seaward edges of mangroves on a variety of substrates.

### **S. lanceolata** Blume

*S. caseolaris* (L.) Engl., misapplied name

Densely foliated *tree* to 14 m; bark smooth with

horizontal rings and orange pustules; pneumatophores thin, pointed, to 80 cm high. *Leaves*  $\pm$  sessile; *blades* elliptic to lanceolate, 60-130 mm long, 17-37 mm wide, L/W 2.7-4.8, coriaceous, penniveined with intramarginal vein, base attenuate, apex acute. *Hypanthium* 12-16 mm long. *Sepals* 18-25 mm long. *Petals* red, linear, 25-30 mm long. Stamens c. 50 mm long. Style c. 65 mm long. *Fruit* 20-36 mm long, 32-45 mm wide. *Flowering* and *fruiting*: June - Oct. Fig. 40

Indonesia, New Guinea, the NT and Qld. In the DR known from Melville Is. and the Wildman R.; also recorded from the South Alligator R. and Arnhem Bay. A mangrove on fine silts or muds in estuarine situations. Very few entire specimens were available for description because the petals and stamens of this species fall quickly after flowering; the cited references provide more complete descriptions.

## LYTHRACEAE

Herbs, shrubs or trees. Leaves opposite or whorled, simple, usually entire; stipules vestigial or absent. Inflorescences various. Flowers 3-8-merous, bisexual, actinomorphic or zygomorphic. Bracteoles present or absent. Hypanthium present. Sepals valvate, with or without appendages between the lobes. Petals alternate with sepals, rarely absent. Stamens usually in 2 whorls and twice the number of sepals or petals, sometimes in 1 whorl equal to, or less than, the number of sepals or petals. Ovary superior; carpels 2-6, fused; locules equal to number of carpels or rarely 1; placentation axile or free central. Fruit a capsule, dehiscing variously.

A family of 28 genera and c. 660 species, widespread in tropical regions. In Australia there are 8 genera and 24 species; 4 genera in the NT. [Hewson & Beesley, 1990]

|    |                                                                             |                 |
|----|-----------------------------------------------------------------------------|-----------------|
| 1. | Woody shrubs .....                                                          | <b>Pemphis</b>  |
| 1. | Annual herbs .....                                                          | <b>2</b>        |
| 2. | Flowers axillary, solitary and sessile or subsessile .....                  | <b>Rotala</b>   |
| 2. | Flowers in axillary cymes or if solitary then on long pedicels .....        | <b>3</b>        |
| 3. | Flowers 4-merous, in dense compound axillary cymes .....                    | <b>Ammannia</b> |
| 3. | Flowers 5-6-merous, in simple axillary cymes or 4-merous and solitary ..... | <b>Nesaea</b>   |

## AMMANNIA L.

Erect often reddish annual herbs, glabrous or almost so. Stems quadrangular. Stipules absent. Leaves opposite. Flowers in most axils, cymose, usually actinomorphic, 4-merous. Hypanthium campanulate. Calyx appendages absent or obscure. Petals present or sometimes absent. Stamens 4-8. Capsule reddish, hyaline; dehiscence irregular.

A worldwide genus of c. 30 species; 4 in Australia and the NT, 2 in the DR.

- |                                            |                      |
|--------------------------------------------|----------------------|
| 1. Leaves attenuate at base .....          | <b>A. baccifera</b>  |
| 1. Leaves cordate-auriculate at base ..... | <b>A. multiflora</b> |

**A. baccifera** L.

*Herb* to 1 m. *Leaves* discolorous; blades narrowly elliptic to elliptic, 8-110 mm long, 3-38 mm wide, L/W 2.9-7.5, attenuate at base. *Hypanthium* 1-2 mm long. *Sepals* shortly triangular, c. 1 mm long. *Petals* absent. *Capsule* globose, 1-2 mm diam., exceeding hypanthium; locule 1, placentation free central, placenta stipitate, globular. *Flowering* and fruiting: throughout year, depending on available moisture. Fig. 41

Widespread through Africa, Europe and Asia to northern Australia. Common on the floodplains of the DR. Favours clay soils on margins of waterholes and creekbanks; often in weed proportions in areas disturbed by stock. Also in shaded areas in rainforest.

**A. multiflora** Roxb.

*Herb* to 60 cm. *Leaves* slightly discolorous; blades sessile, oblong-linear to narrowly lanceolate or oblanceolate, 18-44 mm long, 1.5-9 mm wide, L/W 3.7-14, base cordate-auriculate, sometimes obscurely so. *Hypanthium* c. 1 mm long. *Sepals* broadly triangular, c. 0.2 mm long. *Petals* purple, obovate, 0.5-1 mm long. *Capsule* 1.5-2.5 mm diam.; locules 2, placentation axile, placenta elliptic. *Flowering* and fruiting: throughout year, depending on available moisture. Fig. 41

Widespread from Africa to Australia. Rare in the DR from East Point and on the Adelaide R. floodplain. The DR specimens show features intermediate with the introduced species *A. auriculata* Willd.

## NESAEA Kunth

A genus of 50 species native to Africa, Madagascar, India, Australia and America; 5 species in Australia, all recorded in the NT but only 1 known from the DR.

**N. striatiflora** Hewson

Annual glabrous erect *herb* to 25 cm. Stipules absent. *Leaves* opposite,  $\pm$  sessile; blades linear-terete, 15-30 mm long. *Flowers* usually solitary, sometimes in dichasia, (4)5(6)-merous; peduncle 10-15 mm long, ribbed in upper part. Bracteoles to 2 mm long. *Hypanthium* campanulate, c. 3 mm long, ribbed, ribs maroon, white-membranous between, plicate in bud. *Calyx* appendages blunt.

*Sepals* shallowly triangular, to 0.75 mm long. *Petals* mauve, ovate, to 4 mm long. Stamens 4, rarely 8; anthers exerted. *Capsule* globose, to 4 mm diam., dehiscence irregular. *Flowering* and fruiting: Mar - Apr. Fig. 41

Found in the Kimberley and northern NT in swampy or black soil habitats. In the DR only known from 1 record on the Adelaide R. floodplain. Description taken from Hewson & Beesley (1990).

## PEMPHIS Forster & G.Forster

A genus of 2 species; 1 restricted to Madagascar, the other found from the tropical coasts of eastern Africa to the Pacific Islands and northern Australia.

**P. acidula** Forster & G.Forster

Evergreen *shrub* or small tree to 5 m. Stems and leaves thinly sericeous. Stipules minute. *Leaves* subsessile, decussate, sometimes  $\pm$  succulent; blades elliptic or oblanceolate, 10-23 mm long, 3-8 mm wide, L/W 2.1-3.3. *Flowers* solitary, axillary, 6-merous.

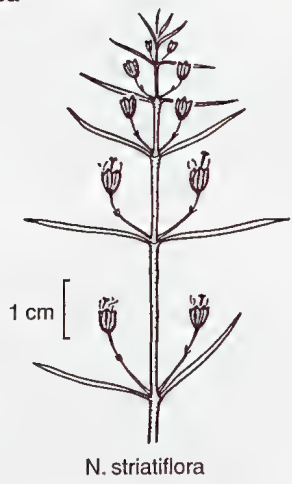
Pedice 5-13 mm long. *Hypanthium* tubular, 3-5 mm long, striate. *Sepals* triangular, 0.5-1 mm long; appendages triangular, c. 0.5 mm long, external to sinus of sepals. *Petals* white, sometimes tinged with pink, orbicular to obovate, 4-5 mm long. Stamens 12, in 2 series. Ovary 3-locular below, 1-locular above,



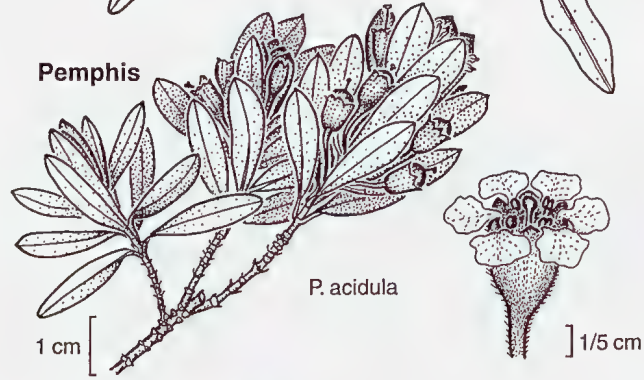
**Ammannia**



**Nesaea**



**Pemphis**



**Rotala**

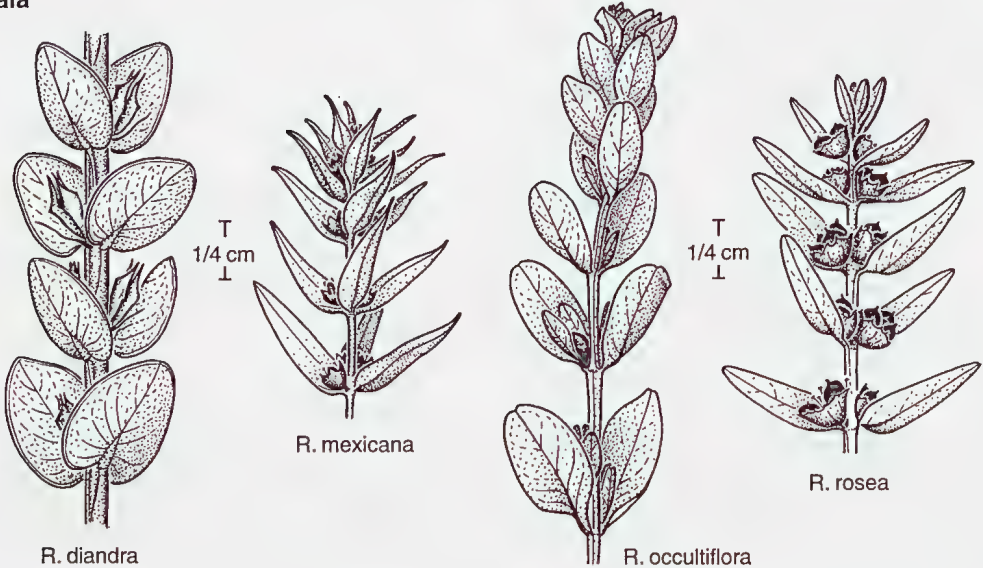


Fig. 41

heterostylous. *Capsule* globose, 3-5 mm diam., circumscissile. *Flowering* and *fruiting*: all year. Fig. 41

Widespread along the coast of northern Australia

and common in the coastal DR. Found on sand or rocky areas. A variety of Aboriginal uses have been recorded; highly favoured as timber for digging sticks (Wightman, 1989).

## ROOTALA L.

Annual or perennial, glabrous, terrestrial or aquatic herbs. Leaves decussate or whorled, sessile or shortly petiolate; stipules absent. Flowers solitary or rarely in reduced cymes, usually regular, 3-5-merous. Hypanthium usually campanulate, hyaline. Sepals 3-5; appendages 3-5 or absent. Petals 3-5 or absent. Stamens 2-5, never more than sepals. Ovary 2-4-locular. Capsule thin walled, ellipsoid, c. equal to length of flower, dehiscing septicidally by valves.

A genus of c. 45 species; 6 recorded in Australia, 5 in the NT, 4 in the DR.

- |    |                                                                              |                        |
|----|------------------------------------------------------------------------------|------------------------|
| 1. | Bracteoles leaf-like, usually 2-3 times length of flower .....               | <b>R. occultiflora</b> |
| 1. | Bracteoles filiform to linear, rarely exceeding hypanthium .....             | <b>2</b>               |
| 2. | Leaves with conspicuous hyaline margin; capsule valves 2 .....               | <b>R. diandra</b>      |
| 2. | Leaves lacking hyaline margin; capsule valves >2 .....                       | <b>3</b>               |
| 3. | Leaves decussate or in whorls; petals and hypanthium appendages absent ..... | <b>R. mexicana</b>     |
| 3. | Leaves decussate; petals and hypanthium appendages present .....             | <b>R. rosea</b>        |

### **R. diandra** (F.Muell.) Koehne

Annual erect *herb*. Leaves decussate, sessile; blades ovate to elliptic-oblong, 4-12 mm long, 2.5-9.5 mm wide, L/W 1.6-3, base obtuse to cordate, margins hyaline. Bracteoles filamentous, 1-2.5 mm long. *Hypanthium* c. 1.5 mm long. *Sepals* 4, c. 1.5 mm long; appendages absent. *Petals* absent or rarely vestigial. Stamens 2. *Capsule* valves 2. *Flowering* and *fruiting*: Apr - Aug. Fig. 41

Widespread from the Gulf of Carpentaria to WA. Rare in the DR where known from one collection on the Mary R. On silty clay soils associated with seasonally wet areas.

### **R. mexicana** Cham. & Schldl.

Annual, terrestrial or aquatic *herbs*. Leaves decussate or in whorls of 3-8, sessile; blades of aerial leaves narrowly elliptic to narrowly lanceolate, 3.5-9 mm long, 0.9-1.5 mm wide; aquatic leaves linear to filiform, to 15 mm long, c. 1 mm wide. Bracteoles filiform, about as long as flower. *Hypanthium* c. 0.5 mm long. *Sepals* 3-5, c. 0.25 mm long; appendages absent. *Petals* absent. Stamens 2-4. *Capsule* valves 3(4). *Flowering* and *fruiting*: Feb - Aug. Fig. 41

Widespread throughout the warmer parts of the world including northern Australia. Scattered in the DR; on sandy soils in seasonally moist habitats.

### **R. occultiflora** Koehne

Annual erect *herb*. Leaves whorled or decussate, sessile; blades ovate to linear, elliptic, 3.5-12 mm long, 0.8-3.5 mm wide, L/W 2-4.3. Bracteoles leaf-like, narrowly elliptic, longer than flower. *Hypanthium* c. 0.5 mm long. *Sepals* 5, c. 0.5 mm long; appendages absent. *Petals* absent. Stamens 3(4). *Capsule* valves 3. *Flowering* and *fruiting*: Apr - Sept. Fig. 41.

India and northern Australia. Rare in the DR where known only from the Adelaide R. On sandy soils in seasonally wet areas.

### **R. rosea** (Poiret) Cook

Annual erect *herb*. Leaves decussate, sessile; blades linear-lanceolate to elliptic, to 20 mm long. *Flowers* solitary or in reduced cymes. Bracteoles linear-lanceolate or filamentous, usually as long as hypanthium. *Hypanthium* c. 1.5 mm long. *Sepals* (4)5, c. 0.25 mm long; appendages (4)5 or rarely absent, subulate. *Petals* (4)5, elliptic to oblong, usually as long as sepals. Stamens 5, rarely less. *Capsule* valves 3-4. *Flowering* and *fruiting*: May - June. Fig. 41

Occurs throughout India, SE Asia, New Guinea, China, Korea and Japan. In Australia from northern NT. No material seen from the DR but one collection from Howard Springs cited by Hewson & Beesley (1990).

THYMELAEACEAE

Annual herbs to trees. Stipules absent or vestigial. Leaves simple, entire. Inflorescences various, often in dense involucre heads. Flowers mostly actinomorphic, usually with well-developed hypanthium. Sepals petaloid, (3)4-5(6). Petals present or in NT species absent. Stamens usually 2-10, free or adnate to hypanthium, often in 2 whorls. Ovary superior, 1-12-locular; ovules 1 per locule, pendulous; style simple. Fruit indehiscent or rarely capsular.

A world wide family of 55-60 genera and over 500 species in Africa, SE Asia to Australia. In Australia 9 genera; 5 genera in the NT, 2 occur in the DR: [Rye & Heads, 1990]

1. Shrubs in rainforest; flowers white .....

Phaleria
1. Herbs in open forest; flowers red .....

Thecanthes

PHALERIA Jack

A genus of 25-30 species, from Sri Lanka to Polynesia and northern Australia. Three species in Australia, 2 occur in the NT and 1 in the DR.

P. octandra (L.) Baillon

*Shrub* to 3 m high. Stems glabrous. *Leaves* opposite, glabrous; petioles 5-8 mm long; blades elliptic, 75-230 mm long, 40-90 mm wide, L/W 2-3.1, acuminate. *Inflorescences* of 8-25-flowered, mostly terminal clusters; involucre bracts 4, elliptic, c. 7 mm long; peduncle 2.5-7 mm long, with

rows of small imbricate bracts. *Flowers* ± sessile on swollen receptacle, white, minutely tomentose. *Hypanthium* 10-17 mm long. *Sepals* 4-5, ± elliptic, 4-7 mm long. *Stamens* 8, exserted, adnate to hypanthium but free in upper part of hypanthium. *Ovary* 2-locular. *Fruit* succulent, red, broadly pyriform, 1-2-seeded. *Flowering* and fruiting: Nov - Mar. Fig. 42

Phaleria

Thecanthes

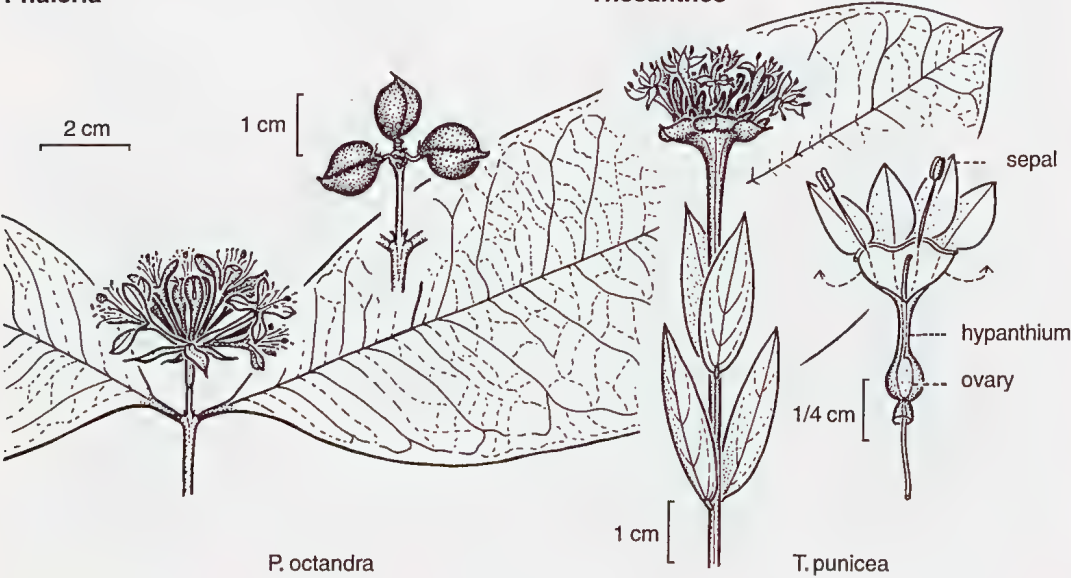


Fig. 42



India, Java, New Guinea to Australia. Coastal from the Tiwi Islands to Gove. Rare in the DR where

known from moist rainforest on the Tiwi Islands and Gunn Point.

## THECANTHES Wikstrom

A genus of 5 species from the Philippines, New Guinea to Australia. All species found in tropical Australia; 4 occur in the NT and 1 in the DR. Until recently these species were in the genus *Pimelea* (Rye & Heads, 1990).

### **T. punicea** (R.Br.) Wikstrom

*Pimelea punicea* R.Br.

Annual herb to 60 cm, glabrous, subglaucous. Leaves decussate or sub-opposite; shortly petiolate; blades lanceolate to elliptic, 7-35 mm long, 2-12 mm wide, L/W 2.9-7.5. Inflorescences a terminal head; peduncle expanded at apex into a funnel-shaped receptacle passing into 4 broad-based involucre bracts; bracts 2-10 mm long. Flowers bright red. Hypanthium 4-9 mm long. Sepals 4, imbricate,

spreading, 1.5-5 mm long. Stamens 2, adnate to hypanthium, free part included or exsert. Ovary 1-locular; style subterminal and eccentric. Fruit dry, enclosed in persistent base of hypanthium. Seed 1, black, obclavate, c. 3.5 mm long, finely alveolate. Flowering and fruiting: Feb - July. Fig. 42

Kimberley to the western Gulf of Carpentaria; common in the DR in open forest habitats on well drained soils.

## ONAGRACEAE

A family of mainly temperate and subtropical regions with about 17 genera and 675 species worldwide. In the NT only 2 genera with only *Ludwigia* recorded in the DR. [Thompson, 1990]

## LUDWIGIA L.

Annual or short lived perennial herbs or herbaceous shrubs. Stipules present. Leaves simple, alternate, entire. Flowers solitary, axillary (in DR taxa), bisexual, actinomorphic, bracteolate. Sepals free, valvate, 4-5, persistent. Petals as many as sepals, caducous, yellow or white, imbricate. Stamens as many as or twice as many as sepals. Anthers versatile. Disc present, hairy. Ovary inferior, hypanthium not extending beyond ovary, locules equal in number to sepals, placentation axile, ovules in 1 or more series in each locule; style stout; stigma turbinate to  $\pm$  globose, shallowly 4-5-lobed. Fruit persistent, indehiscent but seeds released by breakdown of fruit wall. Seeds numerous, either free or embedded in corky tissue of fruit.

A genus of c. 80 species with 4 known for the NT and all recorded in the DR.

- |    |                                                                                                              |                        |
|----|--------------------------------------------------------------------------------------------------------------|------------------------|
| 1. | Plant with prostrate stems, rooting at nodes and with spongy floats;<br>seeds embedded in fruit tissue ..... | <b>L. adscendens</b>   |
| 1. | Plant erect; seeds free at least in upper half of fruit .....                                                | 2                      |
| 2. | Seeds of lower half of fruit embedded in tissue .....                                                        | <b>L. hyssopifolia</b> |
| 2. | Seeds all free .....                                                                                         | 3                      |
| 3. | Fruit <10 mm long; stamens same number as sepals .....                                                       | <b>L. perennis</b>     |
| 3. | Fruit >20 mm long; stamens twice number of sepals .....                                                      | <b>L. octovalvis</b>   |

**L. adscendens** (L.) Hara

Perennial rooted aquatic *herb* with floating stems; adventitious roots and white, spongy, spindle shaped floats at nodes. Vegetative parts glabrous or sparsely hairy with short and long, simple, hyaline hairs. *Stipules* persistent, ovate, c. 0.5 mm long. *Petioles* 3-40 mm long. *Leaf blades* elliptic, oblanceolate, spatulate or obovate, 11-80 mm long, 4-34 mm wide, L/W 1.8-2.7, base attenuate, apex obtuse with dark swollen gland on abaxial surface. *Flowers* in upper axils, pubescent on upper part of ovary and calyx. *Pedicels* 6-26 mm long. *Bracteoles* persistent, sub-opposite, c. 1 mm long, inserted about middle of ovary. *Sepals* 5, narrowly triangular, 5-10 mm long. *Petals* white to pale yellow or yellow at base, obovate, 8-14 mm long. *Stamens* 10. *Fruit* brown, cylindrical, obscurely 10-ribbed, 22-27 mm long, c. 3 mm wide. *Seeds* c. 2 mm long, embedded in fruit tissue. *Flowering* and fruiting: all year depending on moisture availability. Fig. 43

A common species from India to China and northern Australia. Common in the DR on lagoons of the coastal floodplains. In the terrestrial state on drying wetland margins all parts are contracted, more densely pubescent and rarely fertile.

**L. hyssopifolia** (G.Don) Exell

Erect annual *herb* to 0.8 m, rarely taller. Stems finely ribbed, often reddish. Glabrous or with sparse, minute hairs on stems, underside and margin of leaves, ovary and calyx. *Stipules* persistent, minute. *Petioles* 1-6(22) mm long. *Leaf blades* lanceolate to elliptic, 10-90 mm long, 1-20 mm wide, L/W 4.2-7.8; base attenuate; apex acute. *Flowers* shortly pedicellate. *Bracteoles* persistent, sub-opposite, inserted about middle of ovary, minute. *Sepals* 4, narrowly triangular, c. 3 mm long. *Petals* yellow, elliptic to obovate, 1.8-2.5 mm long. *Stamens* 8. *Ovary* 4-ribbed,  $\pm$  quadrangular. *Fruit*  $\pm$  sessile, reddish brown, cylindrical, 12-24 mm long, c. 1.5 mm wide, weathering to 4 persistent ribs. *Seeds* yellowish to pale brown, lenticular, 0.5-0.7 mm long, those from basal part of fruit dispersed with persistent buoyant structures. *Flowering* and fruiting: all year depending on moisture availability. Fig. 43

Africa to India, Malesia, Oceania and northern Australia. Now considered a pantropic weed.

Common in the DR on coastal floodplains, stream margins and moist habitats.

**L. octovalvis** (Jacq.) Raven

Herbaceous, annual or short lived perennial *shrub*, 0.4-2 m high. Stems quadrangular, forming aerenchymatous tissue at base when in water. Vegetative parts, ovary and calyx densely hairy with erect hyaline simple and septate hairs, rarely subglabrous. *Stipules* obscure. *Petioles* 2-8 mm long. *Leaf blades* linear, narrowly elliptic to lanceolate, 60-165 mm long, 2-35 mm wide, L/W 5-35, base attenuate, apex acute to attenuate. *Flowers* shortly pedicellate. *Bracteoles* persistent, inserted at base of ovary, minute or rarely foliaceous. *Sepals* 4, elliptic to lanceolate, 7-13 mm long, falling as fruit matures. *Petals* yellow, obcordate, 6-12(20) mm long. *Stamens* 8, anthers hairy or glabrous. *Fruit* shortly pedicellate, brown,  $\pm$  cylindrical, 8-ribbed, 20-55 mm long, 3-6 mm wide, weathering to 8 persistent ribs. *Seeds* free, brown,  $\pm$  globular, 0.6-0.9 mm diam. *Flowering* and fruiting: Apr - Nov. Fig. 43

Pantropical; throughout northern Australia and in the NT extending into the arid zone. Common in the DR in seasonal or perennially moist habitats. Worldwide a highly variable species. In the NT a distinctive form associated with floodplains differs from the typical by being shorter, subglabrous and narrowly leaved.

**L. perennis** L.

Annual *herb* to 1 m, sparsely hairy with minute stiff hairs. Stems, leaves and calyx sometimes reddish. *Stipules* obscure. *Petioles* to 7 mm long. *Leaf blades* narrowly elliptic to linear, 18-110 mm long, 2-10 mm wide, L/W 11-22; base and apex attenuate. *Flowers*  $\pm$  sessile to shortly pedicellate. *Bracteoles* obscure, at base of pedicel. *Sepals* 4-5, triangular, 2-3 mm long. *Petals* yellow, obovate, 2-4 mm long. *Stamens* 4-5. *Fruit*  $\pm$  sessile, olivaceous to stramineous,  $\pm$  obconic, 4(5)-angled, 6-9 mm long, c. 3 mm wide. *Seeds* free, pink to brown, ellipsoid, 0.3-0.5 mm long. *Flowering* and fruiting: Feb - July. Fig. 43

Widespread throughout the Old World and across northern Australia. In the NT extending south to Newcastle Waters. Common in the DR in seasonal or perennially moist habitats.

Ludwigia

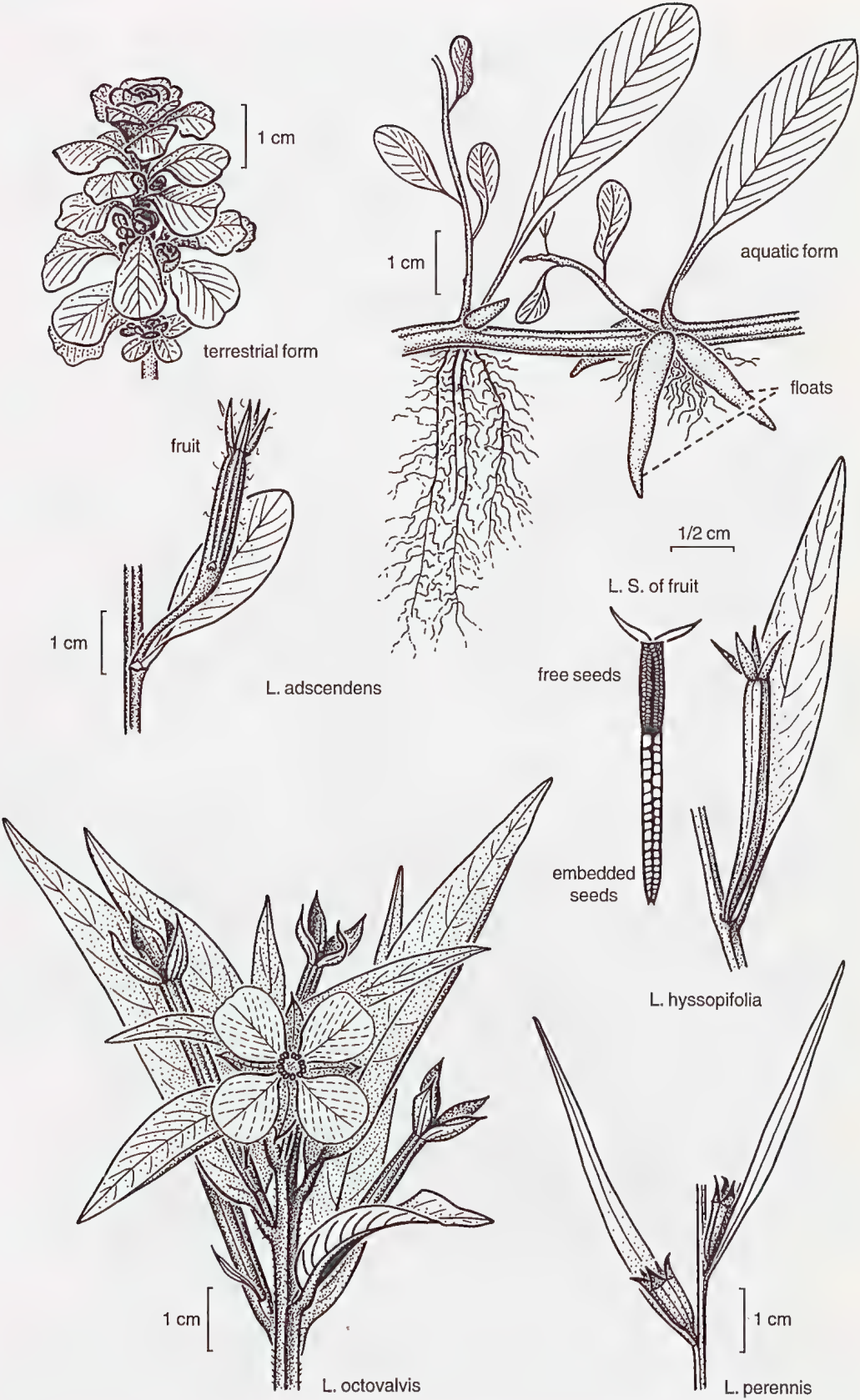


Fig. 43



MELASTOMATACEAE

Shrubs or small trees, evergreen. Leaves simple, entire, usually opposite. Inflorescences cymose, often reduced. Flowers actinomorphic, bisexual, 4-5-merous. Hypanthium well developed. Sepals and petals free on hypanthium; petals often showy. Stamens usually twice the number of petals, uni- or dimorphic; anthers with terminal pores or slits, often with apical or basal appendages. Ovary usually inferior, 1-5-locular; ovules few to numerous, placentation various; style and stigma simple. Fruit a capsule or berry. Seeds 1-numerous.

A pantropical family of c. 250 genera and over 4500 species. Represented in Australia by 7 genera and 10 species. Four genera in the NT with 3 in the DR. [Whiffin, 1990].

1. Leaves 1-nerved, glabrous .....

1. Leaves 3-7-nerved, hairy or bristly .....

2. Leaves 2-13 mm wide; tertiary veins not conspicuous, parallel;  
anthers isomorphic; fruit capsular .....

2. Leaves 10-75 mm wide; tertiary veins conspicuous, parallel;  
anthers dimorphic; fruit fleshy, indehiscent .....
- Memecylon

2

Osbeckia

Melastoma

MELASTOMA L.

A genus of 70-100 species; from India, China and SE Asia through to Australia and the Pacific Islands. One species recognised in Australia.

M. affine D.Don

*Shrub* to 3 m. Stems, petioles, leaf veins and inflorescence densely covered with erect, stiff, lacinate scales. Petiole 10-14 mm long. *Leaf blades* with 3-5 longitudinal nerves and conspicuous parallel cross veins, elliptic to ovate, 40-130 mm long, 10-75 mm wide, L/W c. 1:6; hispid with ± swollen, decurrent based hairs with patent tips. *Inflorescence* terminal or subterminal, cymose, c. 7-flowered. Bracts and bracteoles present, caducous. Hypanthium 5-7 mm long. *Calyx lobes* 5, caducous, alternating with denticles. *Petals* 5, obovate, purple to mauve, to 20 mm long. *Stamens*

usually 10, dimorphic; larger stamens with basally prolonged connective and bilobed appendage at apex of filament; smaller stamens not or little prolonged with a small appendage; anthers with a terminal pore. *Ovary* usually 5-locular; ovules numerous on axile placentas. *Fruit* subfleshy, indehiscent, urceolate, to 10 mm long. *Flowering* and fruiting: all year. Fig. 44

From India, SE Asia through to New Guinea, northern Australia and southwards to coastal NSW. Common in the DR in perennially moist sites often on rainforest margins. The fresh flower buds are eaten (G. Wightman, pers. comm.).

MEMECYLON L.

A genus of 200-300 species; throughout the Old World tropics with 3 species in Australia, 2 of which occur in the NT but with 1 in the DR.

M. pauciflorum Blume

*Shrub* or small tree to 5 m, glabrous. Bark grey to brown, rough, fissured. Branchlets finely ribbed.

*Leaves* shortly petiolate; blades discolourous, elliptic to obovate, 24-70 mm long, 10-30 mm wide, L/W 1.75-3, ± coriaceous, lateral veins obscure,

apex acuminate to emarginate. *Inflorescence* axillary, short, often on old wood. *Flowers* 4-merous. *Hypanthium* c. 1.5 mm long. *Calyx* lobes present as small teeth. *Petals* caducous, c. 2 mm long, thick. *Stamens* 8, isomorphic; anthers versatile, thecae terminal, opening by slits, with dorsal appendage and central circular gland. *Ovary* 1-locular; ovules c. 8 on a basal placenta. *Fruit* blue or black, fleshy,

indehiscent, globose, c. 8 mm diam., crowned by persistent calyx, 1-seeded. *Flowering*: Nov - Feb; fruiting: immature fruit present in most months, maturing Nov - May. Fig. 44

From SE Asia to New Guinea and northern Australia. Common in coastal to subcoastal monsoon thickets on a variety of soils but typically associated with sandstone.

## OSBECKIA L.

A genus of c. 60 species from Africa, India through Malesia to northern Australia. Two species in Australia, both in the NT with 1 in the DR.

### *O. australiana* Naudin

Perennial, scabrous *shrub* to 2 m high. Vegetative parts densely covered with ciliate or subplumose bristles. *Leaves* shortly petiolate; blades 3-nerved, linear to narrowly lanceolate, 15-60 mm long, 2-13 mm wide, L/W 3.7-11.2. *Inflorescence* a few-flowered, condensed, bracteate terminal cyme, rarely elongate. *Flowers* 5-merous. *Hypanthium* 5-6 mm long, densely covered with bristly protuberances, those on the hypanthium summit

longer. *Calyx* lobes triangular, c. 5 mm long, ciliate. *Petals* purple, obovate, c. 10 mm long, ciliate at apex. *Stamens* 10, isomorphic; anthers beaked with single terminal pore. *Ovary* 5-locular; ovules numerous on axile placentas. *Fruit* a capsule, c. 7 mm diam., seeds numerous. *Flowering* and fruiting: all year. Fig. 44.

Occurs from the Kimberley to the western half of Arnhem Land. Common in the DR in open swampy or perennially wet habitats.

### Melastoma

### Memecylon

### Osbeckia

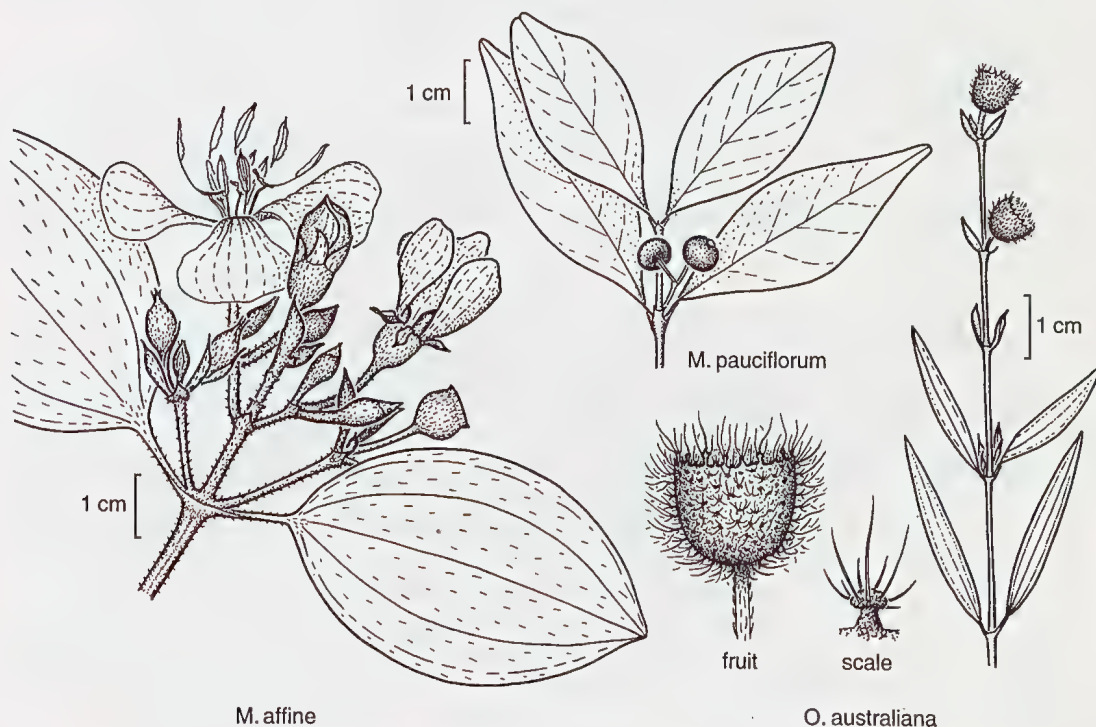


Fig. 44

# COMBRETACEAE

Trees, shrubs or lianas. Indumentum of simple hairs often present. Leaves exstipulate, simple, entire, opposite, spirally arranged or alternate. Domatia and glands often present. Flowers bisexual or male, 4-5-merous, actinomorphic, in axillary spikes or racemes, epigynous. Bracteoles present or absent. Hypanthium usually in 2 distinct parts, the lower surrounding and adnate to the inferior ovary with the upper part projecting to form a short or long tube terminating in the 4-5(8) calyx lobes. Petals 0, 4-5. Stamens usually twice as many as petals (when the latter are present), inserted inside calyx, in 2 series. Ovary unilocular, usually with 2-6 pendulous ovules. Fruit a drupaceous or dry pseudocarp, indehiscent, often winged or ridged, 1-seeded.

A family of 20 genera and 500 species, widespread in tropical and subtropical regions of the world. In Australia there are 6 genera including 1 introduced; 3 genera occur in the DR. [Byrnes, 1977a; Pedley, 1990].

- |    |                                                          |                   |
|----|----------------------------------------------------------|-------------------|
| 1. | Vines; leaves opposite .....                             | <b>Quisqualis</b> |
| 1. | Trees or shrubs; leaves spirally arranged .....          | <b>2</b>          |
| 2. | Mangroves; bracteoles adnate on hypanthium .....         | <b>Lumnitzera</b> |
| 2. | Savanna or monsoon forest trees; bracteoles absent ..... | <b>Terminalia</b> |

## LUMNITZERA Willd.

Small evergreen trees. Leaves spirally arranged, sessile or almost so, spatulate, clustered towards ends of branchlets, slightly fleshy, with a subapical gland on the ventral surface (sometimes obscure in *L. racemosa*), base tapering gradually, apex obtuse to emarginate. Flowers in racemes, 5-merous. Hypanthium rigid. Bracteoles persistent on ovary wall, midway along flower. Stamens 5-10, in 2 series, borne on inner wall of hypanthium, same colour and length as style and petals. Fruit dry, with a tough corky mericarp, dispersed by water. Calyx lobes and style persisting in fruit. Limb of persistent hypanthium striate.

Distributed through E Africa, Madagascar, Asia, northern Australia and Polynesia. In Australia, 2 species, both occurring in the NT and the DR. [Wightman, 1989]

- |    |                                              |                    |
|----|----------------------------------------------|--------------------|
| 1. | Inflorescences terminal; flowers red .....   | <b>L. littorea</b> |
| 1. | Inflorescences axillary; flowers white ..... | <b>L. racemosa</b> |

### **L. littorea** (Jack) Voigt

Tree to 13 m tall with dark grey, fissured bark, and with slender knee-like pneumatophores. *Leaf blades* slightly discolourous, 40-110 mm long, 7-22 mm wide. *Inflorescence* dense, terminal, 30-50 mm long. *Calyx* lobes c. 1.5 mm long; petals red, narrowly elliptic, c. 7 mm long; ovary 4-5 mm long. *Fruit* green, ellipsoid, c. 15 mm long, 4 mm diam., ribbed. *Flowering*: June - Dec; fruiting: Feb, July - Aug. Fig. 45

Northern Qld and the NT; outside Australia in tropical Asia and Polynesia. Uncommon in the DR, where known from Melville Is. and Cox Peninsula. Often growing in sandy freshwater seepages on the landward fringes of mangrove communities.

### **L. racemosa** Willd.

Tree to 7 m tall, bark black, fissured, trunk often bearing adventitious roots at base during the wet season; roots lacking knee-like pneumatophores. All parts usually glabrous, but young leaves and buds sometimes with a soft indumentum. *Leaf blades* concolorous, 20-82 mm long, 10-25 mm wide, subapical gland sometimes obscure. *Inflorescences* axillary, 10-25 mm long. *Calyx* lobes broadly triangular, c. 1.5 mm long; petals white, elliptic to narrowly elliptic, c. 5 mm long. *Fruit* green, ovoid, 10-12 mm long, c. 4 mm diam. *Flowering*: most months; fruiting: Nov - Mar. Fig. 45



Distributed along the north coast of Australia from Broome to Moreton Bay and outside Australia from East Africa, Madagascar, through tropical Asia to Polynesia. Common in the DR. Usually

growing on the landward edges of mangrove communities on sand or mud where there is freshwater seepage. Uses of the timber are listed by Wightman (1989).

## QUISQUALIS L.

A genus of 17 species occurring in Africa and Asia. One introduced species is known from Australia and the DR.

### \**Q. indica* L.

A vigorous evergreen root suckering scrambler or vine. Lower bark reddish and fibrous. Branchlets with an indumentum of crisped, rusty coloured hairs. *Leaves* opposite, pellucid-dotted; petioles 5-7 mm long, rusty tomentose, partly persisting after fall of leaves and their bases forming thorns up to 15 mm long; *blades* elliptic, 45-90 mm long, 17-49 mm wide, varying from tomentose to nearly glabrous, base rounded to subcordate, apex acuminate. *Flowers* in terminal or axillary bracteate spikes, 5-merous, sweetly scented, the whole inflorescence minutely rusty tomentose. Hypanthium

60-68 mm long; calyx lobes broadly triangular, 1.5-3 mm long; corolla pink to white with red markings, turning red with age, lobes oblong, 11-20 mm long; stamens 10, the upper series exsert, the lower included. Fruit dry, ovoid to ellipsoid, with 5 longitudinal wings, to 40 mm long. *Flowering*: most months; rarely fruiting in the DR. Fig. 45

#### Rangoon Creeper

Widespread in the tropics and subtropics of the Old World; widely cultivated elsewhere. Commonly cultivated in Darwin and often persisting in areas of past habitation. A difficult plant to control because of its root suckering habit.

## TERMINALIA L.

Trees, mostly deciduous, branching usually sympodial. Leaves spirally arranged, often crowded towards ends of branchlets, petiolate, often with glands and domatia. Flowers 5-merous, in axillary spikes, usually with male flowers towards apex and bisexual flowers towards base. Hypanthium short; calyx lobes deltoid or triangular; petals absent. Stamens 10, exserted. Fruit fleshy or dry and winged.

A genus of c. 200 species widely distributed through the tropics of the Old World. In Australia there are 29 native species of which 12 occur naturally in the DR. *Terminalia catappa*, *T. melanocarpa* and *T. bellirica* are cultivated in Darwin for shade; some local species (e.g. *T. microcarpa*, *T. erythrocarpa*) are also cultivated. Pedley's (1990) treatment differs in some detail to that given here. The following account more closely follows that of Byrnes (1977a).

Three mechanisms of dispersal (wind, water and animals) are evident in the Australian species. The fruit of species of sea coasts and river margins typically have spongy or corky outer layers adapting them for water dispersal (e.g. *T. catappa*, *T. erythrocarpa* and *T. platyphylla*). The small fleshy fruited *T. microcarpa* is well adapted for dispersal by frugivorous birds. The larger fleshy fruited species of open forest and woodland (e.g. *T. ferdinandiana*, *T. latipes* and *T. carpentariae*) are probably dispersed by larger birds such as emus and bower birds. The widespread *T. grandiflora* has a large fruit with a thick stony endocarp and may be dispersed by emus or in the past by now extinct megafauna. Species with winged fruit which typically live in savannas are wind dispersed (e.g. *T. platyptera*, *T. canescens* and *T. pterocarya*).

Various Australian species are used by humans. Three species have been tested for their food value (Miller *et al.*, 1993). The kernel of Indian Almond (*T. catappa*) has a protein content of 20% and is used for food in many tropical countries. The kernels of *T. grandiflora* are of similar protein content. The fleshy fruit of *T. ferdinandiana* is high in vitamin 'C'; this species is now commercially available as Kakadu Plum jam. The flesh of *T. catappa*, *T. carpentariae* and *T. microcarpa* are eaten by Aboriginal people. [Coode, 1973; Byrnes, 1977a; Pedley, 1990].

## KEY BASED ON LEAF CHARACTERS

|     |                                                                                                               |                         |
|-----|---------------------------------------------------------------------------------------------------------------|-------------------------|
| 1.  | Plants <1 m high .....                                                                                        | <i>T. ferdinandiana</i> |
| 1.  | Plants >1 m high .....                                                                                        | 2                       |
| 2.  | Leaf blades 7-14 times as long as wide .....                                                                  | 3                       |
| 2.  | Leaf blades <7 times as long as wide .....                                                                    | 4                       |
| 3.  | Leaves glabrescent or glabrous .....                                                                          | <i>T. grandiflora</i>   |
| 3.  | Leaves usually densely sericeous .....                                                                        | <i>T. canescens</i>     |
| 4.  | Young vegetative growth and older leaves glabrous<br>( <i>T. erythrocarpa</i> sometimes sparsely hairy) ..... | 5                       |
| 4.  | Young vegetative growth hairy, older leaves sericeous, glabrescent or glabrous .....                          | 7                       |
| 5.  | Leaf blades >2.2 times as long as wide .....                                                                  | <i>T. erythrocarpa</i>  |
| 5.  | Leaf blades <2 times as long as wide .....                                                                    | 6                       |
| 6.  | Rachis of inflorescence and fruit tomentose .....                                                             | <i>T. latipes</i>       |
| 6.  | Rachis of inflorescence and fruit glabrous .....                                                              | <i>T. ferdinandiana</i> |
| 7.  | Mature leaves densely and persistently tomentose or sericeous, at least below .....                           | 8                       |
| 7.  | Mature leaves glabrous or glabrescent .....                                                                   | 12                      |
| 8.  | Leaves 4-8 times as long as wide .....                                                                        | <i>T. canescens</i>     |
| 8.  | Leaves 1-2 times as long as wide .....                                                                        | 9                       |
| 9.  | Domatia usually conspicuous and many; petiolar glands absent .....                                            | <i>T. fitzgeraldii</i>  |
| 9.  | Domatia inconspicuous, often absent; lateral glands present on petiole .....                                  | 10                      |
| 10. | Leaves $\pm$ concolorous, older ones densely tomentose above .....                                            | <i>T. carpentariae</i>  |
| 10. | Leaves discolorous, older ones glabrescent above .....                                                        | 11                      |
| 11. | Petiole usually <20 mm long .....                                                                             | <i>T. platyptera</i>    |
| 11. | Petiole usually >20 mm long .....                                                                             | <i>T. platyphylla</i>   |
| 12. | Leaves usually >200 mm long, narrowly cordate at base .....                                                   | <i>T. catappa</i>       |
| 12. | Leaves <200 mm long, not narrowly cordate at base .....                                                       | 13                      |
| 13. | Leaves concolorous .....                                                                                      | 14                      |
| 13. | Leaves discolorous .....                                                                                      | 15                      |
| 14. | Petiole usually >20 mm long .....                                                                             | <i>T. fitzgeraldii</i>  |
| 14. | Petiole <20 mm long .....                                                                                     | <i>T. pterocarya</i>    |
| 15. | Petiole usually >20 mm long .....                                                                             | <i>T. platyphylla</i>   |
| 15. | Petiole <20 mm long .....                                                                                     | 16                      |
| 16. | Domatia present .....                                                                                         | <i>T. microcarpa</i>    |
| 16. | Domatia absent .....                                                                                          | <i>T. volucris</i>      |

## KEY BASED ON FRUIT CHARACTERS

|    |                                                                                      |                         |
|----|--------------------------------------------------------------------------------------|-------------------------|
| 1. | Plants <1 m high .....                                                               | <i>T. ferdinandiana</i> |
| 1. | Plants >1 m high .....                                                               | 2                       |
| 2. | Fruit dry, broadly winged .....                                                      | 3                       |
| 2. | Fruit lacking wings, although sometimes flattened .....                              | 6                       |
| 3. | Wing on fruit of nearly even width, continuing around body; leaves concolorous ..... | 4                       |
| 3. | Wing on fruit not of even width around body; leaves discolorous .....                | 5                       |

|     |                                                                                                    |                         |
|-----|----------------------------------------------------------------------------------------------------|-------------------------|
| 4.  | Older leaves densely tomentose, leaves 4-8 times as long as wide .....                             | <b>T. canescens</b>     |
| 4.  | Older leaves glabrous to glabrescent, leaves <4 times as long as wide .....                        | <b>T. pterocarya</b>    |
| 5.  | Fruit hairy, 50-120 mm wide including wing .....                                                   | <b>T. platyptera</b>    |
| 5.  | Fruit glabrous, 20-70 mm wide including wing .....                                                 | <b>T. volucris</b>      |
| 6.  | Leaves 7-14 times as long as wide .....                                                            | <b>T. grandiflora</b>   |
| 6.  | Leaves <5 times as long as wide .....                                                              | <b>7</b>                |
| 7.  | Fruit >50 mm long; leaves >140 mm long, narrowly cordate at base .....                             | <b>T. catappa</b>       |
| 7.  | Fruit <50 mm long; leaves usually <140 mm long, base cuneate, truncate, attenuate or cordate ..... | <b>8</b>                |
| 8.  | Both rachis of inflorescence and fruit glabrous or very sparsely hairy .....                       | <b>9</b>                |
| 8.  | Rachis of inflorescence (and often fruit) hairy .....                                              | <b>10</b>               |
| 9.  | Leaves >2 times as long as wide; fruit <10 mm diam., <20 mm long, red when mature .....            | <b>T. erythrocarpa</b>  |
| 9.  | Leaves <2 times as long as wide; fruit >11 mm diam., >21 mm long, yellow-green when mature .....   | <b>T. ferdinandiana</b> |
| 10. | Mature fruit glabrescent .....                                                                     | <b>11</b>               |
| 10. | Mature fruit tomentose or sericeous .....                                                          | <b>12</b>               |
| 11. | Fruit <15 mm diam.; leaves discolorous .....                                                       | <b>T. platyphylla</b>   |
| 11. | Fruit >20 mm diam.; leaves concolorous .....                                                       | <b>T. fitzgeraldii</b>  |
| 12. | Fruit <18 mm long, thinly fleshy, sericeous .....                                                  | <b>T. microcarpa</b>    |
| 12. | Fruit >18 mm long, thickly fleshy, tomentose .....                                                 | <b>13</b>               |
| 13. | Leaves glabrous .....                                                                              | <b>T. latipes</b>       |
| 13. | Leaves tomentose .....                                                                             | <b>T. carpentariae</b>  |

### **T. canescens** (DC.) Radlk.

An evergreen *tree* to 8 m tall. Bark brown-grey, plated. Petioles 4-28 mm long, densely sericeous. *Leaf blades* narrowly elliptic, elliptic, narrowly oblanceolate to oblanceolate, 28-75 mm long, 5-35 mm wide, L/W (2)4-8, usually densely sericeous, rarely glabrescent, 1-several domatia often present, base attenuate with a pair of indistinct lateral glands at the junction with the petiole, apex obtuse. *Inflorescences* 15-90 mm long. *Fruit* dry, winged, flattened, elliptic to obovate, 15-40 mm long, 11-21 mm wide overall, wing 3-8 mm wide. *Flowering*: Nov - Feb; *fruiting*: Mar - Sept. Fig. 45

WA, NT and Qld, from the northern Pilbara to the Gulf. Rare in the DR where known only from the south of the Region and from the Adelaide River/Litchfield area. In open woodlands on skeletal soils. The above description does not include *T. bursarina* F. Muell. which is synonymised under *T. canescens* by Pedley (1990).

### **T. carpentariae** C.T.White

*T. hadleyana* subsp. *carpentariae* (C.T.White) Pedley

A deciduous *tree* usually c. 6 m tall, rarely to 15

m. Bark grey, flaking to reveal pale orange-brown inner bark. All parts densely and persistently tomentose with brown (rarely white) hairs. Petioles 16-50 mm long, with a pair of conspicuous lateral glands. *Leaf blades* coriaceous, ± concolorous, elliptic to broadly elliptic, orbicular, occasionally oblong or obovate, 50-160 mm long, 38-107 mm wide, L/W 1-2, domatia inconspicuous, base rounded, truncate or cordate, sometimes unequal, apex rounded to emarginate. *Inflorescences* 75-224 mm long. *Fruit* fleshy, yellow-green when ripe, ovoid to ellipsoid, 14-37 mm long, 12-15 mm diam., densely tomentose, sometimes with a short beak or angles. *Flowering*: Oct - Dec, with or just after the previous year's fruit ripens; *fruiting*: Sept - Nov. Fig. 45

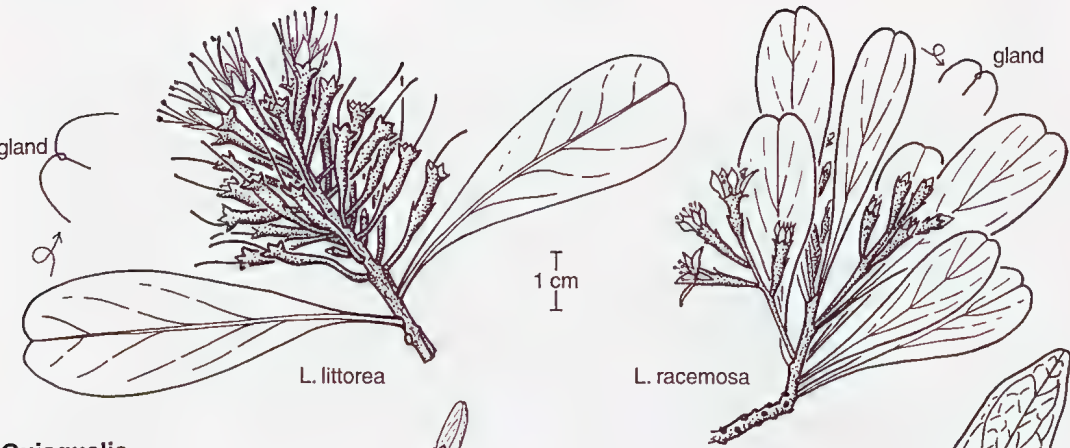
In northern Australia, from the eastern Kimberley to the southern Gulf. In the DR relatively rare. Usually grows on skeletal soil on sandstone, but also on lateritic ridges and coastal sand dunes.

### **T. catappa** L.

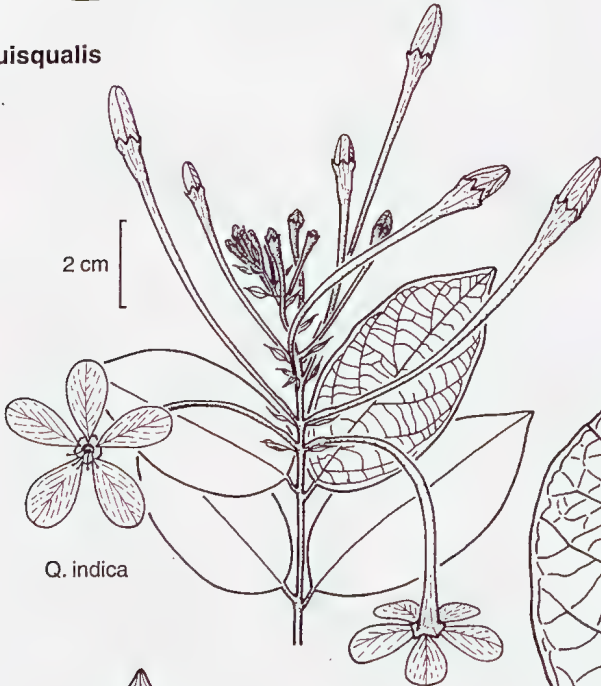
A deciduous *tree* to 15 m tall. Bark grey-brown, ± smooth. Young growth brown sericeous, becoming glabrous with age. Petioles 5-15 mm long, densely



**Lumnitzera**



**Quisqualis**



**Terminalia**

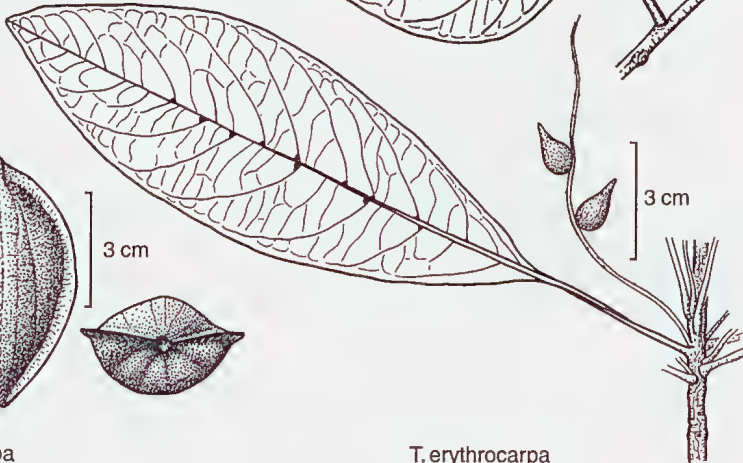
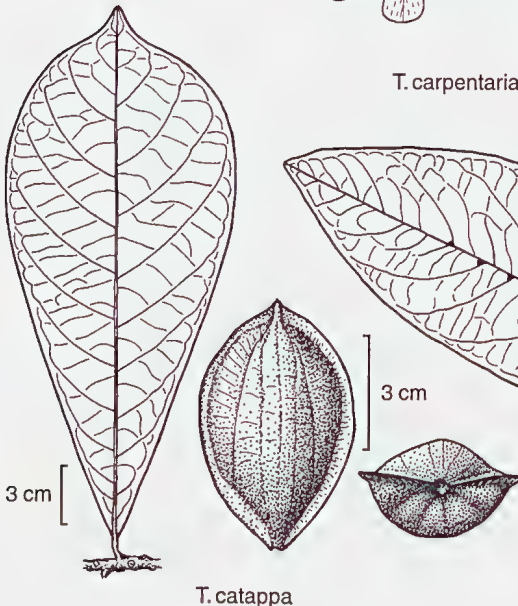
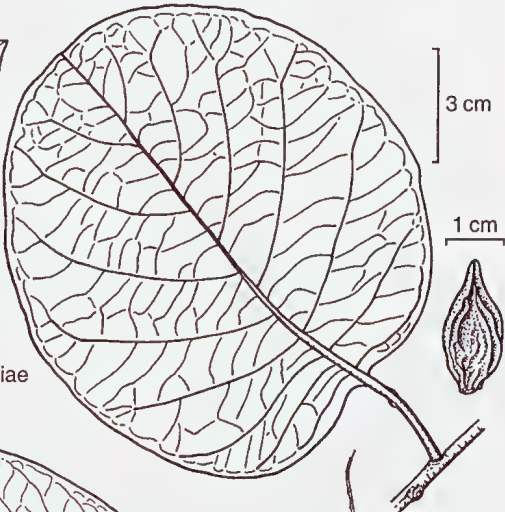


Fig. 45

brown sericeous. *Leaf blades* slightly discoloured, glossy above, obovate, 140-260 mm long, 106-145 mm wide, L/W 1.3-2.2, domatia many, base narrowly cordate, glands present at base of blade, apex obtuse to shortly acuminate. *Inflorescences* 70-200 mm long. *Fruit* yellow or red when ripe, firmly fleshy, compressed ellipsoid, 57-65 mm long, 37-42 mm wide, glabrous. *Flowering*: Oct - Feb; *fruiting*: Dec - Jan. Fig. 45

**Indian Almond**

Occurring naturally above beaches in India, SE Asia, Polynesia, eastern Arnhem Land and north Qld. Widely planted in the tropics. Cultivated in the DR. Coode (1973) mentions that the fruit of the New Guinea species is red while yellow fruited trees are regarded as cultivars.

***T. erythrocarpa* F.Muell.**

A riverine *tree* to 6 m tall. Bark grey, flaked, finely fissured. All parts glabrous. Leaves crowded or widely spaced; petioles 17-70 mm long; blades slightly discoloured, narrowly elliptic, rarely broader or ovate, 90-225 mm long, 26-60 mm wide, L/W (1.9)2.3-4.2, domatia usually present, base cuneate, a pair of indistinct lateral glands present near junction of blade and petiole, margin slightly sinuate, apex acute. *Inflorescences* 4-140 mm long. *Fruit* fleshy, red when mature, ovoid, with a distinct beak, 14-20 mm long, 7-8 mm diam. *Flowering*: Oct - Jan; *fruiting*: Jan - June. Fig. 45

Endemic to the northern NT, from Victoria River to eastern Arnhem Land. Relatively common in the DR. A strictly riparian species, often growing with *Barringtonia acutangula* (L.) Gaertner, with which it is easily confused when sterile.

***T. ferdinandiana* Exell**

*T. latipes* subsp. *psilocarpa* Pedley

A deciduous small *tree* to c. 7 m tall. Bark grey, irregularly tessellated. All parts glabrous. Petioles 12-118 mm long. *Leaf blades* strongly discoloured, subglaucous, broadly elliptic to broadly ovate, occasionally obovate, 110-330 mm long, 87-235 mm wide, L/W 1-1.7, domatia prominent, base truncate, a pair of (sub)opposite lateral glands present near junction of blade and petiole, apex rounded. *Inflorescences* 160-190 mm long, glabrous throughout. *Fruit* fleshy, yellow-green when mature, ovoid,  $\pm$  flattened, 20-30 mm long, 12-18 mm wide, when immature beaked and with prominent lateral ridges. *Flowering*: Oct - Dec; *fruiting*: Apr - June. Fig. 46 **Green Plum, Salty Plum, Kakadu Plum**

In the NT north of 15°S, from central Arnhem Land to Broome in the Kimberley Region. Common in the

DR. Growing on better drained sites in Eucalypt communities, on a variety of soil types. Plants regenerating after fire frequently exist as low regrowth <1 m tall, and can flower and fruit at this size. These have been described as *T. prostrata* by Pedley (1990).

***T. fitzgeraldii* C.Gardner**

A *tree* to 12 m tall. Bark dark grey, deeply tessellated. All vegetative parts sericeous (rarely glabrescent), with brown hairs. Petioles 15-42 mm long. *Leaf blades* concolorous, ovate to elliptic, rarely obovate to spatulate, 40-110 mm long, 27-73 mm wide, L/W 1.3-2, domatia usually conspicuous and many, base attenuate, apex obtuse to rounded, rarely acute. Young foliage often densely brown sericeous with a distinct sheen. *Inflorescences* 55-90 mm long. *Fruit* purple when ripe, fleshy, smooth, glabrescent, ovoid with a distinct beak, 30-40 mm long, 22-25 mm diam. *Flowering*: Sept - Dec; *fruiting*: Jan - June. Fig. 46

From the western Kimberley to the Top End, between Derby and the Alligator Rivers region. Uncommon in the DR. On clay soils on seasonally inundated floodplains. Sucker regrowth occurs after fire and can flower and fruit at ground level.

***T. grandiflora* Benth.**

A deciduous *tree* to 14 m tall. Bark grey, deeply fissured. All parts brown sericeous when young. Foliage pendulous. Petioles 3-25 mm long. *Leaf blades* narrowly oblanceolate to narrowly elliptic, 40-130 mm long, 6-16 mm wide, L/W 7.2-13.9, sparsely sericeous, domatia usually present, irregular, clustered, glands absent, base tapered gradually, apex obtuse. *Inflorescences* 40-90 mm long. *Fruit* black and shiny, globular to ovoid, glabrous, 35-45 mm long, 22-28 mm wide, with a fine beak. *Flowering*: with the new growth, July - Oct; *fruiting*: Dec - Feb, occasionally later. Fig. 46

In the Kimberley and Top End from Broome to the Gulf of Carpentaria. Common in the DR. On deeper sandy soils in coastal and inland situations, often on the margins of broad drainage lines.

***T. latipes* Benth.**

A deciduous *tree* to 10 m tall. Bark tessellated, grey, flaking to expose the orange inner bark. All parts glabrous except for the inflorescence. Petioles 15-60 mm long, with 1 or more pairs of lateral glands. *Leaf blades* broadly elliptic to broadly obovate, coriaceous, 77-200 mm long, 56-140 mm wide, L/W 1-1.7, domatia  $\pm$  conspicuous, base truncate or shortly



tapered, apex obtuse to rounded. *Inflorescences* 60-170 mm long, with an indumentum of short tomentose brown hairs. *Fruit* fleshy, yellowish-green, ovoid, 22-40 mm long, 13-18 mm wide, with a persistent indumentum of short tomentose brown hairs, flattened and beaked when immature. *Flowering*: with the new growth during Sept - Oct; fruiting: immature fruit are held until they ripen in the following Sept - Oct. Fig. 46

In the Kimberley and the Top End, from Broome to eastern Arnhem Land and Vanderlin Is. In the southern part of the DR. Growing on skeletal soils on sandstone or quartzite.

**T. microcarpa** Decne

*T. sericocarpa* F.Muell.

A semideciduous or deciduous *tree* to 30 m tall. Bark black, fissured, hard. Young shoots brown sericeous to tomentose, becoming glabrous with age. Petioles 2-10 mm long, glands absent. *Leaf blades* discolorous, obovate to spatulate, occasionally elliptic, 40-160 mm long, 15-70 mm wide, L/W 1.5-3.1, sericeous to glabrous, domatia present, base cuneate to attenuate, apex obtuse to emarginate, often shortly acuminate. *Inflorescences* 35-114 mm long, sericeous. *Fruit* purple, thinly fleshy, flattened-ellipsoid, 11-14 mm long, 7-8 mm wide, sericeous. *Flowering*: Sept - Nov; fruiting: mainly Nov, but occasionally later. Fig. 46

New Guinea and Australia from the Kimberley to Qld, between Kalumburu and Rockhampton, mostly within 100 km of the coast. A monsoon forest species, common in the DR along streams and floodplain margins where there is moisture at least at depth. The fruit are a favourite with frugivorous birds; also palatable to humans. Byrnes (1977a) comments on the closeness of *T. sericocarpa* and *T. microcarpa* and after examination of material at Kew (by GJL and M. Coode) we are convinced that the two are synonymous.

**T. platyphylla** F.Muell.

A semideciduous *tree* to 10 m tall, rarely more. Bark grey, fissured. All parts softly tomentose. Petioles 17-50 mm long, bearing glands. *Leaf blades* slightly discolorous, coriaceous, elliptic to obovate, 74-195 mm long, 40-125 mm wide, L/W 1.1-2, becoming glabrescent above, domatia sometimes present, inconspicuous, glands present on the veins of the lamina, base attenuate to truncate, apex obtuse to broadly emarginate. *Inflorescences* 64-165 mm long. *Fruit* purple, thinly fleshy, narrowly ellipsoid, occasionally ovoid to obovoid, 20-40 mm long, 9-12

mm wide, including a narrow beak of 3-10 mm long, glabrescent. *Flowering*: Oct - Feb; fruiting: May - Sept. Fig. 46

Found across northern Australia north of 20°S latitude. Common in the DR; on banks of permanent and seasonal streams or occasionally on alluvium.

**T. platyptera** F.Muell.

A deciduous *tree* to 10 m. Bark grey, tessellated. All parts softly tomentose when young, becoming less hairy with age. Petioles 10-18 mm long, with a pair of lateral glands. *Leaf blades* coriaceous, discolorous, oblanceolate, obovate or elliptic, 35-95 mm long, 14-40 mm wide, L/W 1.5-3.5, undersurface with distinct, fine reticulate venation; usually tomentose when mature, at least below, domatia absent, base cuneate, often unequal, apex obtuse (occasionally emarginate). *Inflorescences* 50-150 mm long. *Fruit* 2-winged, yellow, body 20-28 mm long, including divaricate wings 59-115 mm wide, tomentose to sparsely tomentose. *Flowering*: Nov - Jan; fruiting: Apr - Sept. Fig. 46

From the eastern Kimberley to Qld. In the DR known only from near the Douglas R. Grows on a variety of soils, but often with a high clay content. Forms woodland and open woodland communities.

**T. pterocarya** F.Muell.

A slender evergreen *tree* to 5 m, sometimes in short coppicing stands. Bark brown-grey, plated. Branchlets pendulous. Petioles, base of leaves, young leaves and branchlets with a short adpressed indumentum which is sparse or absent on the older leaves. Petioles 5-18 mm long, tomentose. *Leaf blades* concolorous, elliptical, broadly elliptic to obovate, occasionally rhomboidal, 22-75 mm long, 10-50 mm wide, L/W 1.3-2.5, 1-several domatia often present, base attenuate with a pair of indistinct lateral glands at the junction with the petiole, apex obtuse to occasionally emarginate. *Inflorescences* 24-110 mm long. *Fruit* dry, winged, flattened, elliptic, 25-30 mm long, 11-20 mm wide overall, wing 7-10 mm wide. *Flowering*: most months but mainly Dec - Mar; fruiting: Mar - July. Fig. 46

Endemic to the Top End and common in the DR. On sandy soils along broad drainage lines or on alluvial soils near creeks. Closely related to *T. canescens*.

**T. volucris** R.Br. ex Benth.

*T. oblongata* subsp. *volucris* (R.Br. ex Benth.) Pedley

A deciduous *tree* to 7 m tall. Bark grey, tessellated, persistent. Young parts densely sericeous to tomentose, becoming glabrescent at maturity.



Terminalia

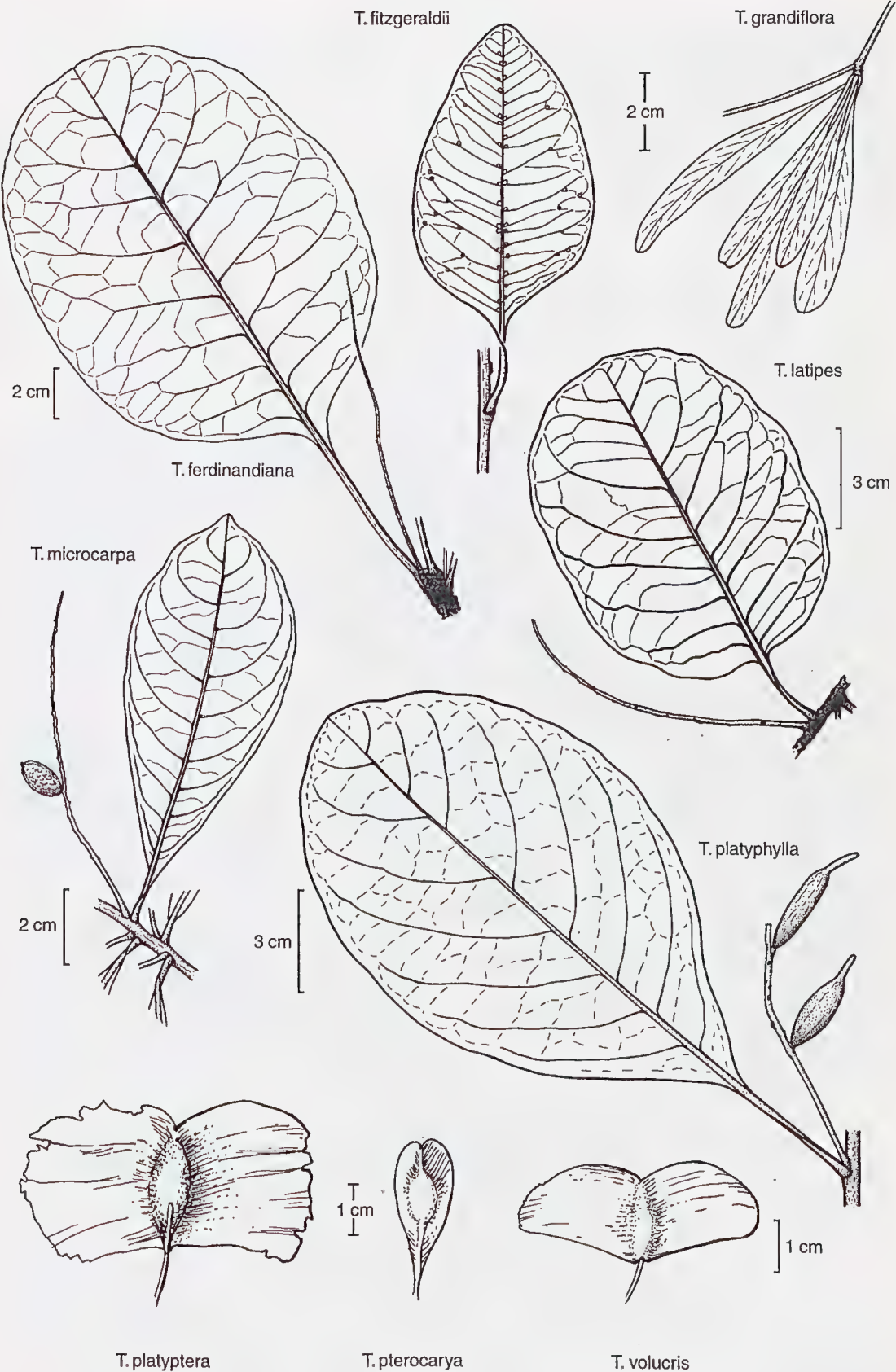


Fig. 46

Petioles 4-15 mm long, with a pair of obscure lateral glands at the top or at the base of the leaf blade. *Leaf blades* discolorous, obovate, elliptic or obdeltoid, 21-110 mm long, (15)30-62 mm wide, L/W 1.3-2.2, domatia absent, base often unequal, attenuate, apex blunt to emarginate. *Inflorescences* 31-120 mm long. *Fruit* a dry, glabrous, yellow to yellowish-green, 2-winged nut, body 15-25 mm long, flattened on one

side, angled on the other, including wings, 27-70 mm wide. *Flowering*: Aug - Dec; *fruiting*: Oct - Jan, often on the bare branches. Fig. 46

From the Kimberley to the Gulf. In the DR, known from coastal monsoon vine forest at Gunn Point and Mandorah. Inland the species grows on heavy soils which become seasonally waterlogged.

## MYRTACEAE

Trees or shrubs; oil dots present in most organs. Stipules present or absent. Leaves opposite or alternate, rarely whorled, simple, often sclerophyllous, entire, intramarginal vein often present. Inflorescence cymose to racemose or flowers solitary and axillary, bisexual or rarely unisexual, actinomorphic, rarely zygomorphic, epigynous to perigynous, the hypanthium often well developed. Perianth (3)4-5(6)-merous, parts free or variously united to form a calyptra (operculum); petals sometimes absent. Stamens few to numerous, borne at the rim or on the upper surface of the hypanthium, free in a continuous or interrupted ring or united at the base into 4 or 5 bundles or united for part of their length into a tube; staminodes sometimes present; anther connective with an apical gland, thecae opening by longitudinal slits or apical pores; nectary borne on the summit of the ovary or lining the hypanthium. Ovary inferior to superior, 1-5(16)-locular; placentation axile, ovules 2-many per locule. Style usually terminal with a capitate stigma. Fruit a 1-many seeded berry or a capsule, a drupe or a nut.

About 140 genera and 3000 or more species in tropical, subtropical and to a lesser extent, temperate regions throughout the world; 75 genera in Australia. Represented in the NT by 24 genera; 14 genera and 66 species in the DR. The family has traditionally been recognised as consisting of two subfamilies, the Myrtoideae and the Leptospermoideae. The former are generally fleshy fruited and best developed in the New World, the latter are mostly capsular and are centred in the Australasian region. Johnson & Briggs (1983) provide keys to all Australian genera as well as keys and descriptions for the subfamilies and alliances.

- |    |                                                        |                     |
|----|--------------------------------------------------------|---------------------|
| 1. | Fruit dry; dehiscent or indehiscent .....              | 2                   |
| 1. | Fruit succulent or firmly fleshy; indehiscent .....    | 12                  |
| 2. | Leaves >3 mm wide .....                                | 3                   |
| 2. | Leaves reduced, scale-like or linear, <3 mm wide ..... | 11                  |
| 3. | Flowers united in a spheroidal head .....              | 4                   |
| 3. | Flowers free .....                                     | 5                   |
| 4. | Stamens connate for two thirds of their length .....   | <b>Asteromyrtus</b> |
| 4. | Stamens connate at their bases only .....              | <b>Melaleuca</b>    |
| 5. | Leaves <7 mm wide .....                                | <b>Leptospermum</b> |
| 5. | Leaves >7 mm wide .....                                | 6                   |
| 6. | Petals absent; mangrove .....                          | <b>Osbornia</b>     |
| 6. | Petals present; upland species .....                   | 7                   |
| 7. | Inflorescence a spike, "bottle brush" .....            | <b>Melaleuca</b>    |
| 7. | Inflorescence otherwise .....                          | 8                   |

|     |                                                             |                     |
|-----|-------------------------------------------------------------|---------------------|
| 8.  | Perianth parts not distinct; operculum present .....        | <b>Eucalyptus</b>   |
| 8.  | Perianth parts distinct; operculum absent .....             | <b>9</b>            |
| 9.  | Leaves opposite .....                                       | <b>Xanthostemon</b> |
| 9.  | Leaves alternate .....                                      | <b>10</b>           |
| 10. | Stamens yellow .....                                        | <b>Xanthostemon</b> |
| 10. | Stamens white .....                                         | <b>Lophostemon</b>  |
| 11. | Sepals finely divided; staminodes present .....             | <b>Verticordia</b>  |
| 11. | Sepals long acuminate, not divided; staminodes absent ..... | <b>Calytrix</b>     |
| 12. | Leaves strongly 3-veined .....                              | <b>Rhodamnia</b>    |
| 12. | Leaves penniveined .....                                    | <b>13</b>           |
| 13. | Fruit hard .....                                            | <b>14</b>           |
| 13. | Fruit succulent .....                                       | <b>15</b>           |
| 14. | Mangrove; leaves glabrous .....                             | <b>Osbornia</b>     |
| 14. | Non-maritime plant; leaves lepidote below .....             | <b>Myrtella</b>     |
| 15. | Shrubs; leaves lepidote below .....                         | <b>Myrtella</b>     |
| 15. | Trees(mostly); leaves without scales .....                  | <b>16</b>           |
| 16. | Anther thecae globose; Melville Is. ....                    | <b>Acmena</b>       |
| 16. | Anther thecae elongate .....                                | <b>17</b>           |
| 17. | Petals usually 6-8; Melville Is. ....                       | <b>Acmenosperma</b> |
| 17. | Petals 4-5 or petals calyprate .....                        | <b>Syzygium</b>     |

## ACMENA DC.

Australia and Malesia; 7 species in Australia, 1 in the NT and the DR. [Hyland, 1983]

### **A. hemilampra** (F.Muell. ex F.M.Bailey) Merr. & L.M.Perry subsp. **hemilampra**

Evergreen *tree* to 30 m; glabrous; bark reddish brown, fibrous. *Leaves* opposite; petioles 5-10 mm long; blades elliptic, lanceolate, 50-150 mm long, 27-68 mm wide, base attenuate, apex acute to acuminate. *Inflorescence* cymose, terminal, to 85 mm long. *Flowers* 4-5-merous; buds clavate, c. 2.5 mm long. *Hypanthium* 1-1.5 mm long, 1.5-2.5 mm wide.

*Sepals* inconspicuous. *Petals* white, c. 0.5 mm long. *Stamens* 0.5-1 mm long. *Fruit* succulent, white, depressed globular with a terminal cavity around the style base, c. 10 mm long. Seed solitary, cotyledons ruminant. *Flowering*: Sept - Nov; fruiting: Nov - Jan. Fig. 47

On the Australian east coast from Torres Strait to Port Macquarie. In the DR recorded from Melville Is. where it occurs on perennial streams in rainforest.

## ACMENOSPERMA Kausel

Two species in Australia, both in Qld; 1 in the NT and the DR; the genus extends to India. [Hyland, 1983]

### **A. claviflorum** (Roxb.) Kausel

Evergreen small *tree* or *shrub* to 5 m (tree to 25 m outside the DR); glabrous. *Leaves* opposite; petioles

c. 3 mm long; blades usually elliptic, 75-130 mm long, 27-50 mm wide, base attenuate, apex acute to acuminate. *Inflorescence* cymose, contracted and



appearing almost umbellate, terminal and axillary. *Flower* buds clavate, 8-13 mm long. *Hypanthium* 2-3 mm long, 1.5-3.5 mm wide. *Sepals* 4-5, broadly triangular, c. 0.4 mm long. *Petals* 6-8, white,  $\pm$  cohering and falling together. *Stamens* to 5 mm long. *Fruits* succulent, dark red to black, turbinate to ellip-

soid, to 10 mm long. Seed one, cotyledons ruminate. *Flowering*: Oct - May; *fruiting*: Nov - May. Fig. 47

Widely distributed from tropical Australia to China and India. In the DR recorded only from Melville Is.; on perennial streams in rainforest.

## ASTEROMYRTUS Schauer

A genus of 7 species of tropical Australia and New Guinea; 4 species in the NT, 1 in the DR. [Craven, 1989]

### A. symphyocarpa (F.Muell.) Craven

*Melaleuca symphyocarpa* F.Muell.

*Tree* 2-5 m high; bark brown, stem fluted in larger trees. *Leaves* glabrous; petioles 1-2 mm long; blades narrowly elliptic, (15)31-75 mm long, (4)8-18 mm wide, L/B 3.3-5.3. *Inflorescence* a spheroidal head. *Hypanthium* sericeous, c. 3 mm long. *Sepals* transversely oblong or semicircular, 1-1.5 mm long. *Petals* clawed, the blades  $\pm$  orbicular, c. 3 mm long.

*Stamens* orange, in bundles, connate for c. 2/3 length of the bundle, 11-13 per bundle; bundles 12-15 mm long. *Fruit* 10-16 mm diam. *Flowering*: Dec - Mar, July - Sept; *fruiting*: all year. Fig. 47

Occurring from Darwin eastward to Cape York and New Guinea. In the DR and elsewhere it is usually on sandy soils associated with seasonal and permanent water. The leaves are used for medicinal purposes by various Aboriginal groups (Abor. Comm. NT, 1988).

## CALYTRIX Labill.

Evergreen shrubs or small trees. Stipules minute. Leaves small, alternate, decussate or verticillate. Inflorescence of solitary axillary flowers. Bracteoles free or partly connate. Flowers bisexual, perianth peri- or epigynous, 5-merous. Hypanthium (in DR species) produced above the ovary into a tube, free from the style. Sepals imbricate, free or slightly connate, usually persistent. Petals deciduous. Stamens many, 1- or 2-seriate (in DR species); filaments free; anthers dehiscing by longitudinal slits, connective prominent in DR species; staminodes absent in DR species. Ovary 1-locular; ovules 2(4); style persistent in fruit in DR species. Fruit dry, hypanthium little changed in fruit; indehiscent. Seed 1.

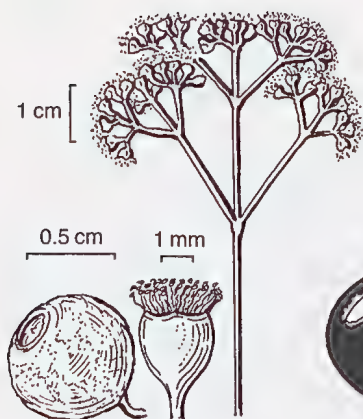
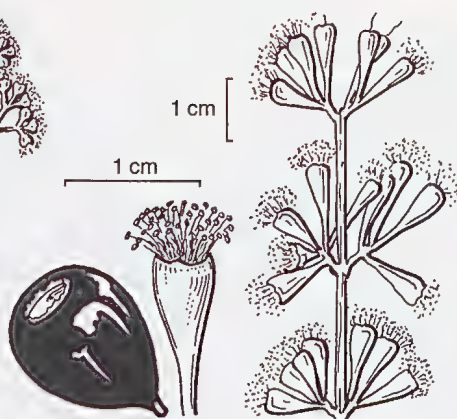
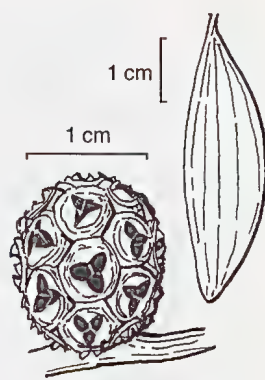
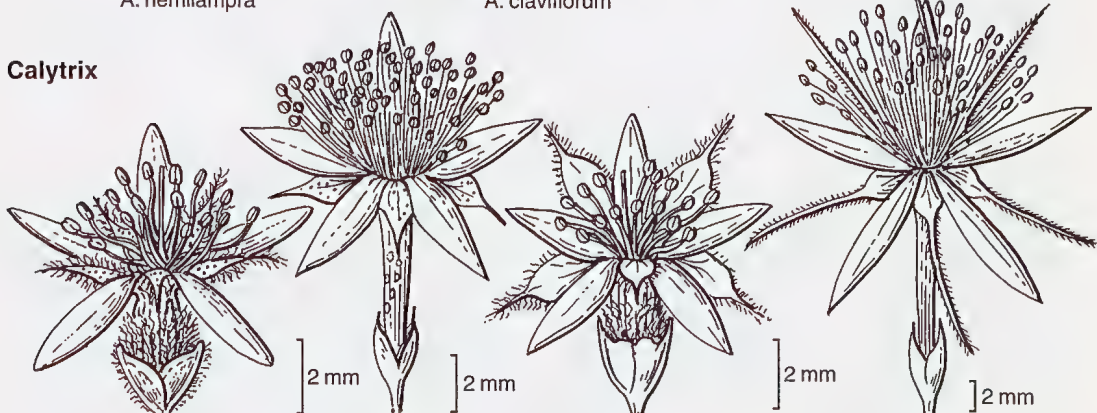
Australian endemic; c. 75 species, mostly in south western Australia; 14 species in the NT, 4 in the DR. [Craven, 1987; 1990]

- |                                                                                   |                       |
|-----------------------------------------------------------------------------------|-----------------------|
| 1. Flowers pink or reddish pink .....                                             | <b>C. exstipulata</b> |
| 1. Flowers white .....                                                            | 2                     |
| 2. Leaves peltate, ovate-triangular; bracteoles partly connate; small trees ..... | <b>C. arborescens</b> |
| 2. Leaves not peltate, $\pm$ linear; bracteoles free; shrubs .....                | 3                     |
| 3. Leaves <2 mm long; primary stems with many short shoots to 13 mm long .....    | <b>C. achaeta</b>     |
| 3. Leaves 2-11 mm long; short shoots few and scattered on primary shoots .....    | <b>C. brownii</b>     |

### C. achaeta F.Muell.

*Shrub* to 3 m, rarely taller; whole plant pubescent; primary shoots with dense leafy short shoots to c. 13 mm long. Stipules obscure. *Leaves* spaced on main stems, imbricate on short shoots; petioles closely adpressed to branchlets, 0-0.2 mm long; blades  $\pm$

triangular in cross section, c. 1.5 mm long. *Flowers* mostly solitary, clustered in the upper short shoots. Bracteoles obovate, with a broad hyaline margin, c. 1.5 mm long. *Hypanthium* obconic, 10-ribbed, hirsute, c. 1.5 mm long. *Sepals* very shortly connate, broadly elliptic or ovate, 1-2.3 mm long, ciliate, long

**Acmena***A. hemilampra***Acmenosperma***A. claviflorum***Asteromyrtus***A. symphyocarpa***Calytrix***C. achaeta**C. arborescens**C. brownii**C. exstipulata***Fig. 47**

acuminate. *Petals* white, narrowly elliptic, 3-4 mm long, obtuse. *Stamens* 1-seriate, 12-18, anthers all fertile. Style persistent, c. 5 mm long. *Flowering and fruiting*: Feb - Sept. Fig. 47

Common and widespread from north eastern Arnhem Land to western Kimberley. Often in small groves on bare or sparsely grassed rocky rises.

***C. arborescens* (F.Muell.) Benth.**

*Shrub* or tree to 7 m, trunk fluted in tree forms; bark grey, rough; usually glabrous. Stipules rusty coloured, obscured by the leaves, linear, c. 0.2 mm long. *Leaves* sessile, peltate, imbricate; blades ovate-triangular, broadly triangular in cross section, 1-2 mm long, 0.75-1 mm wide, the base truncate, margin entire, acuminate. *Flowers* in small terminal clusters. Bracteoles connate for 2/3 of their length, abruptly constricted into a cylindrical base, 3.5-4.5 mm long, the lobes broadly ovate, acuminate. *Hypanthium* narrowly obconic, 10-ribbed, c. 8 mm long. *Sepals* ovate to lanceolate, c. 4 mm long, long acuminate. *Petals* white, narrowly lanceolate, c. 6 mm long, acute. *Stamens* 2-seriate, 45-60. Style c. 5 mm long. *Flowering and fruiting*: June - Oct. Fig. 47

An NT endemic. In the DR known from Melville Is. and Litchfield NP area. Common on the western margins of the Arnhem Land plateau with scattered occurrences elsewhere. On white sand sheets associated with sandstone. In dried specimens the leaves invariably fall, exposing whitish branches with persistent stipules.

***C. brownii* (Schauer) Craven**

*C. brachychaeta* (F.Muell.) Benth.

*Shrub* to 4 m, rarely taller, branchlets often pendulous, pubescent or vegetative parts glabrous. Stipules c. 0.3 mm long, inconspicuous. *Leaves* imbricate, slightly spreading; petioles closely adpressed, c. 0.7 mm long; blades linear,  $\pm$  triangular in cross section, 2-11 mm long, 0.3-1 mm wide, acute. *Flowers* in terminal clusters or subterminal due to continued growth of the flowering shoot. Bracteoles free, obovate with a strong midrib, abruptly narrowed to a long acuminate tip. *Hypanthium* fusiform, faintly 10-ribbed, c. 4 mm long. *Sepals* narrowly triangular to narrowly lanceolate, c. 3 mm long, long acuminate. *Petals* white, lanceolate to narrowly elliptic, c. 3.5 mm long, glabrous, long acute.



*Stamens* 1-seriate, c. 20. *Style* c. 4 mm long. *Flowering and fruiting*: Apr - Oct. Fig. 47

The Kimberley to the Gulf of Carpentaria, Qld. In the DR recorded only in the Finnis-Reynolds R. area. Usually associated with sandstone.

### **C. exstipulata** DC.

*C. microphylla* A.Cunn.

Erect *shrub* to 2 m, rarely taller, glabrous. *Stipules* caducous. *Leaves* sessile or nearly so; blades narrowly ovate to linear, mostly glabrous, sometimes ciliate, 1-3.5 mm long, 0.25-1 mm wide, longer in juvenile foliage, acute. *Flowers* terminally clustered on main and leafy axillary shoots. Bracteoles connate for 2/3 of their length, the tube tapering to the base, c. 7 mm long, lobes broadly ovate, long

acuminate. *Hypanthium* dark red,  $\pm$  cylindrical, mostly 10-ribbed, 8-13 mm long, glabrous. *Sepals* dark red,  $\pm$  orbicular, 10-12 mm long including the fine scabrid awn of c. 8 mm. *Petals* pink, whitish at the base, narrowly elliptic, c. 10 mm long, glabrous, narrowly acute. *Stamens* 2-seriate, c. 30, filaments pink, white in the lower half. *Style* to 25 mm long. *Flowering and fruiting*: all months, mainly June - Aug. Fig. 47

### **Turkey Bush**

Common and widespread in the DR and across its range from the Kimberley to the Gulf of Carpentaria, Qld. Occurs on a variety of sites in open vegetation; also in groves on disturbed areas such as road verges and borrow pits. A population with pure white flowers is known from north eastern Arnhem Land. Cultivated.

## **EUCALYPTUS** L'Her.

Trees or mallees. Plants heterophyllous, the juvenile, intermediate and adult leaves usually differing within a species in insertion, size, shape and vestiture. Adult leaves usually alternate, petiolate. Inflorescence unit umbelliform, the units axillary or in terminal panicles or corymbs or in complex axillary clusters. Flowers bisexual, rarely functionally male. Calyx vestigial or forming an operculum with the corolla. Corolla operculate. Operculum coriaceous, circumscissile, 1- or 2-layered. Stamens numerous, free, usually in several series on the hypanthium rim, rarely in discontinuous bundles; staminodes sometimes present; anthers dehiscing by longitudinal slits or terminal pores; connective with a terminal or median gland. Nectary annular, between the staminal ring and valves. Ovary inferior or half inferior, 2-7-locular; ovules many. Fruit a woody or coriaceous capsule, usually loculicidally dehiscent; valves included to exsert. Seeds variously shaped, shed with a chaff of unfertilised ovules.

In excess of 600 species, most endemic to Australia. In the NT c. 70 species, 31 in the DR.

Chippendale (1988) in the *Flora of Australia* provides a summary of literature and attributes along with descriptions, distribution maps and photographs of bark types. The most useful modern contribution to the classification of the genus is that of Pryor & Johnson (1971) with further refinements in Johnson & Briggs (1983, 1984). The eleven subgeneric categories proposed by these authors are generally well accepted as constituting natural and recognisable groups. A further, recent proposal will see the Bloodwoods and the Paper-fruited Bloodwoods (see below) separated from *Eucalyptus* and combined to form a single new genus.

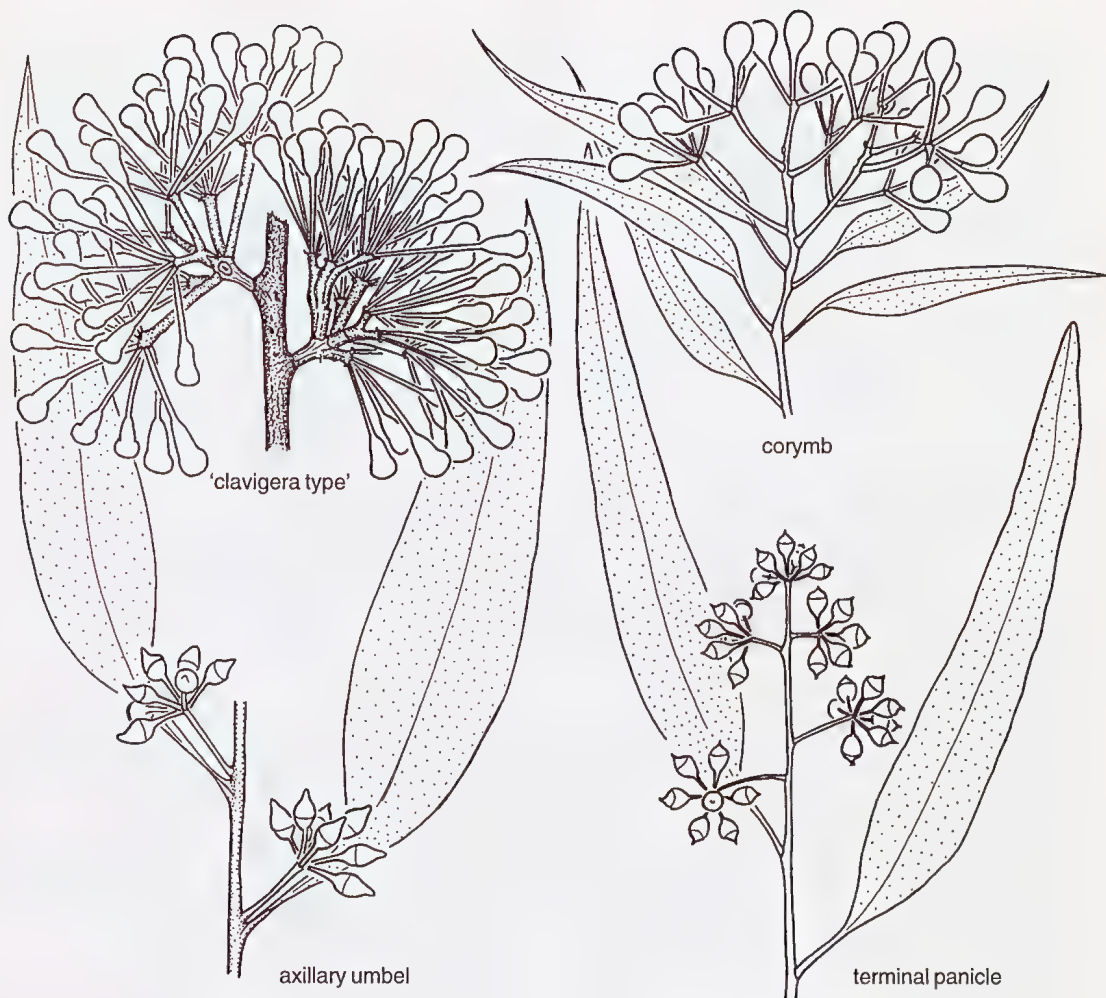
Features of the Red Gum type (*E. camaldulensis*) and Bloodwood type (*E. ptychocarpa*) flower are illustrated in Fig. 48. In the Bloodwood type the hypanthium extends well above the ovary and is lined by the nectary. The valves of the Bloodwood capsule are retracted at dehiscence and are referred to as included or sunken. In the Red Gum type, the top of the ovary extends above the hypanthium rim and in fruit the valves retain their position (exserted) with the nectary forming a broad disc around them. The inflorescence unit typical of the Red Gums and of many other species is classed in this Flora as an umbel (Fig. 48). Pryor & Johnson (1971) trace the possible derivation of this basic unit from the complex dichasium and suggest an alternative name (umbellaster) to distinguish it from the indeterminant umbel of other plant groups.

Of the 11 subgeneric assemblages, 4 occur in the DR. The Bloodwoods, the Eudesmids and the Paper-fruited Bloodwoods contain the majority of species (63%) and dominate the savannas.

### **Eudesmids**

*E. miniata*, *E. phoenicea*, *E. tetradonta*. A small group within the genus and considered to be one of the most primitive. Unusual features worth noting in the local species are the four calyx teeth in *E. tetradonta* and the presence of two valves only in *E. phoenicea*. Species of the group generally have large, often coloured flowers in axillary inflorescences.





a outer operculum  
b inner operculum

c style  
d stamens

e ovary  
f valves

g nectary  
h nectary disc

L.S. of bud (Bloodwood) with inferior ovary and L.S. of corresponding fruit with sunken valves.

L.S. of bud (Red Gum) with half inferior ovary, the outer operculum being shed by expanding bud. Corresponding fruit with exerted valves.

### Bloodwoods

*E. bleeseri*, *E. dichromophloia*, *E. ferruginea*, *E. foelscheana*, *E. jacobsiana*, *E. latifolia*, *E. nesophila*, *E. polycarpa*, *E. porrecta*, *E. ptychocarpa*, *E. setosa*. The Bloodwoods are characterised by the urn shaped woody fruits, large winged seeds (except *E. jacobsiana*) and inflorescences of many-flowered and conspicuous corymbs (except *E. setosa*, *E. ferruginea*) (Fig. 48). Rhizomes are a feature of many of the bloodwoods (Lacey 1974, Lacey & Whelan 1976) and a number of species produce large clonal patches of diminutive plants flowering and fruiting at less than a metre high. "Bloodwood" bark as used in Australian literature and in this Flora is persistent, thick and tessellated. Many of the Top End Bloodwoods have smooth, white deciduous bark with subpersistent red-brown flakes.

### Paper-fruited Bloodwoods

*E. clavigera*, *E. confertiflora*, *E. grandifolia*, *E. kombolgiensis*, *E. papuana*. Also known as Ghost Gums or Cabbage Gums, the group has a mainly tropical distribution and most flower and set fruit in the period of rising daily temperature in the late Dry Season. Seed set is rapid with dehiscence usually completed before the onset of the Wet. Inflorescence type for the group has been termed "clavigera" type in this Flora. The inflorescence structure defies description in its most complex form, being a composite of inflorescences and reduced inflorescence-bearing branches (Pryor & Johnson, 1971) (Fig. 48). Bark type is either fully smooth white gum or the lower part persistent, rough and tessellated. Some species (*E. clavigera*, *E. confertiflora*) appear to be obligately deciduous, a trait rare in the genus. For notes on deciduousness in the genus generally see Blake (1953) and Carr (1972). The capsule is mostly thin walled; seeds are saucer-shaped and relatively large.

### Symphyomyrtus

The largest and most diverse of the subgeneric groups, Symphyomyrtus also has the widest geographical distribution with species in all parts of the continent. Except for *E. umbrawarrensensis* which is more closely related to the *E. brevifolia* group, and *E. brachyandra* which belongs with two other tropical species, the local species fall into two groups, the Red Gums and the Boxes.

Red Gums and relatives: *E. alba*, *E. apodophylla*, *E. bigalerita*, *E. camaldulensis*, *E. herbertiana*, *E. tintinnans*. The Red Gums are characterised by smooth or "gum" bark, axillary inflorescences (Fig. 48), capsules with exert valves, relatively fine seed, and seedlings with quadrangular stems. The gum bark of these and other species is shed annually; the newly exposed bark in *E. herbertiana*, *E. bigalerita* and *E. tintinnans* turns a brilliant salmon colour to eventually fade to off-white.

Boxes, Ironbarks: *E. oligantha*, *E. tectifera*, *E. patellaris*, *E. jensenii*. Coolibah (*E. microtheca*), not included in this Flora, is also a Box. The Boxes and Ironbarks have rough grey bark, dense timber, terminal panicles (Fig. 48), staminodes, usually small capsules and fine seeds. "Box" bark as used in this Flora is grey, persistent and rough; fibres are short and the outer layers weather and become friable. The Boxes generally favour clay soils although *E. tectifera* and *E. patellaris* are mostly on high, well drained sites. Because of their dense timber, all species are ideal for fencing and firewood. *E. jensenii* is the Territory's only Ironbark.

The genus is of major economic importance in Australia and world wide, mainly as a source of timber but also for oils, honey, windbreaks etc. Top End species have been little utilised for milling because of the piping caused by termites though *E. nesophila* and *E. tetrodonta* are harvested on Melville Is. for a round pole market in Darwin. Local apiarists regard *E. tetrodonta* as a good source of pollen; all the other species are good sources of nectar. Aboriginal uses of the eucalypts are extensive. *E. tetrodonta* is probably the most widely utilised: didgeridoos, bark for painting, bark canoes, bark containers, harpoon shafts, etc. The termite-hollowed stems of *E. tintinnans* and *E. phoenicea* are also ideal for didgeridoos. Pharmacological properties are reported for several species by Specht (1958), Scarlett *et al.* (1982), Abor. Comm. NT (1988), Wightman & Smith (1989), Smith & Wightman (1990). Infusions from the bark and/or leaves are taken internally or externally for various ailments and the dissolved gum or kino from Bloodwoods is used as an antiseptic for sores.

### KEY BASED ON FRUIT CHARACTERS

- |                                                 |   |
|-------------------------------------------------|---|
| 1. Leaves opposite .....                        | 2 |
| 1. Leaves mostly alternate or subopposite ..... | 4 |

|     |                                                                                                                                |                         |    |
|-----|--------------------------------------------------------------------------------------------------------------------------------|-------------------------|----|
| 2.  | Branchlets glabrous, pruinose .....                                                                                            | <i>E. apodophylla</i>   |    |
| 2.  | Branchlets hairy .....                                                                                                         |                         | 3  |
| 3.  | Petioles >4 mm long; pedicels 1-3(6) mm long; capsules 11-23 mm diam. ....                                                     | <i>E. ferruginea</i>    |    |
| 3.  | Petioles <4 mm long; pedicels 2-15 mm long; capsules 19-40 mm diam. ....                                                       | <i>E. setosa</i>        |    |
| 4.  | Fruit <2.5 mm long .....                                                                                                       | <i>E. brachyandra</i>   |    |
| 4.  | Fruit >2.5 mm long .....                                                                                                       |                         | 5  |
| 5.  | Adult leaves (at least some) deltoid to broadly lanceolate or<br>broadly ovate, >50 mm wide (but see <i>E. miniata</i> ) ..... |                         | 6  |
| 5.  | Adult leaves lanceolate or oblong; <50 mm wide .....                                                                           |                         | 16 |
| 6.  | Fruit usually strongly ribbed, >26 mm long, >17 mm wide .....                                                                  |                         | 7  |
| 6.  | Fruit usually smooth, <26 mm long, <17 mm wide .....                                                                           |                         | 8  |
| 7.  | Fruit on pedicels >5 mm long .....                                                                                             | <i>E. ptychocarpa</i>   |    |
| 7.  | Fruit sessile .....                                                                                                            | <i>E. miniata</i>       |    |
| 8.  | Fruit thin walled, easily crushed .....                                                                                        |                         | 9  |
| 8.  | Fruit woody, not easily crushed .....                                                                                          |                         | 11 |
| 9.  | Adult leaves rough to touch .....                                                                                              | <i>E. confertiflora</i> |    |
| 9.  | Adult leaves glabrous .....                                                                                                    |                         | 10 |
| 10. | Fruit >14 mm long, >10 mm diam. ....                                                                                           | <i>E. grandifolia</i>   |    |
| 10. | Fruit <14 (rarely to 16) mm long, <10 mm diam. ....                                                                            | <i>E. clavigera</i>     |    |
| 11. | Fruit sessile or pedicels <3 mm long; inflorescence of axillary umbels .....                                                   |                         | 12 |
| 11. | Fruit on pedicels >3 mm long; inflorescence a corymb or panicle .....                                                          |                         | 13 |
| 12. | Fruit (excl. pedicel) 8-10 mm long, 7-13 mm wide .....                                                                         | <i>E. bigalerita</i>    |    |
| 12. | Fruit (excl. pedicel) 3-4 mm long, 5-6 mm wide .....                                                                           | <i>E. tintinnans</i>    |    |
| 13. | Leaves deltoid to orbicular; valves level with rim or exserted .....                                                           | <i>E. oligantha</i>     |    |
| 13. | Leaves lanceolate to broadly ovate, valves sunken .....                                                                        |                         | 14 |
| 14. | Fruit (excl. pedicel) <15 mm long, <13 mm wide .....                                                                           | <i>E. latifolia</i>     |    |
| 14. | Fruit > 15 mm long, >13 mm wide .....                                                                                          |                         | 15 |
| 15. | Fruit 13-19 mm wide; bark mostly smooth with persistent flaky bark on lower trunk ....                                         | <i>E. foelscheana</i>   |    |
| 15. | Fruit 16-26 mm wide; bark rough bloodwood type throughout .....                                                                | <i>E. porrecta</i>      |    |
| 16. | Fruit in threes; hypanthium distinctly 4-toothed .....                                                                         | <i>E. tetradonta</i>    |    |
| 16. | Fruit otherwise .....                                                                                                          |                         | 17 |
| 17. | Valves (in dehiscent fruit) level with rim or exserted .....                                                                   |                         | 18 |
| 17. | Valves sunken .....                                                                                                            |                         | 23 |
| 18. | Fruit (excl. pedicel) >6 mm long and wide .....                                                                                | <i>E. patellaris</i>    |    |
| 18. | Fruit <6 mm long and wide .....                                                                                                |                         | 19 |
| 19. | Pedicels of fruit >5 mm long .....                                                                                             | <i>E. camaldulensis</i> |    |
| 19. | Pedicels of fruit <5 mm long .....                                                                                             |                         | 20 |
| 20. | Inflorescence terminal, a panicle; an ironbark .....                                                                           | <i>E. jensenii</i>      |    |
| 20. | Inflorescence axillary, umbelliform; bark smooth .....                                                                         |                         | 21 |
| 21. | Leaves lanceolate, 14-16 mm wide; petioles 12-42 mm long;<br>of seasonally swampy habitats .....                               | <i>E. alba</i>          |    |
| 21. | Leaves mostly narrowly lanceolate, <13 mm wide; petioles <18 mm long;<br>of rocky ridges .....                                 |                         | 22 |



|     |                                                                                                             |                          |
|-----|-------------------------------------------------------------------------------------------------------------|--------------------------|
| 22. | Disc conspicuous, >1 mm wide; valves exsert, 2-2.5 mm long;<br>fruit broadest at rim .....                  | <i>E. herbertiana</i>    |
| 22. | Disc inconspicuous, <1 mm wide; valve tips only exsert, <1.5 mm long;<br>fruit broadest below the rim ..... | <i>E. umbrawarrensis</i> |
| 23. | Fruit thin walled, easily crushed .....                                                                     | 24                       |
| 23. | Fruit woody, not easily crushed .....                                                                       | 28                       |
| 24. | Inflorescence a terminal panicle .....                                                                      | <i>E. tectifera</i>      |
| 24. | Inflorescence axillary .....                                                                                | 25                       |
| 25. | Inflorescence on current season's shoots; bark smooth<br>throughout or with short rough stocking .....      | <i>E. papuana</i>        |
| 25. | Inflorescence on past season's (woody) shoots; bark rough on lower trunk .....                              | 26                       |
| 26. | Adult leaves scabrous .....                                                                                 | <i>E. confertiflora</i>  |
| 26. | Adult leaves smooth .....                                                                                   | 27                       |
| 27. | Adult leaves >28 mm wide; petioles >13 mm long .....                                                        | <i>E. clavigera</i>      |
| 27. | Adult leaves <22 mm wide; petioles <12 mm long .....                                                        | <i>E. kombolgiensis</i>  |
| 28. | Inflorescence axillary; valves 2 .....                                                                      | <i>E. phoenicea</i>      |
| 28. | Inflorescence terminal; valves 3 or more .....                                                              | 29                       |
| 29. | Fruit <13 mm long .....                                                                                     | 30                       |
| 29. | Fruit >13 mm long .....                                                                                     | 32                       |
| 30. | Bark rough, bloodwood type, to small branches; fruit >10 mm long;<br>Melville and Bathurst Is. ....         | <i>E. nesophila</i>      |
| 30. | Bark otherwise; fruit usually <10 mm long, rarely to 11 mm. ....                                            | 31                       |
| 31. | Bark fibrous throughout; petioles 6-12 mm long; seed not winged .....                                       | <i>E. jacobsiana</i>     |
| 31. | Bark tessellated on lower trunk, smooth above; seed winged .....                                            | <i>E. dichromophloia</i> |
| 32. | Fruit mostly <14 mm wide .....                                                                              | 33                       |
| 32. | Fruit >14 mm wide .....                                                                                     | 34                       |
| 33. | Bark bloodwood type throughout; fruit elongated-urceolate, scurfy;<br>leaves dull .....                     | <i>E. polycarpa</i>      |
| 33. | Bark smooth at least on upper trunk and branches; fruit $\pm$ cylindrical,<br>smooth; leaves shiny .....    | <i>E. bleeseri</i>       |
| 34. | Bark rough bloodwood type throughout .....                                                                  | <i>E. porrecta</i>       |
| 34. | Bark smooth on upper trunk and branches .....                                                               | <i>E. foelscheana</i>    |

**KEY BASED ON FLOWER CHARACTERS**

|    |                                                                                             |                       |
|----|---------------------------------------------------------------------------------------------|-----------------------|
| 1. | Leaves opposite .....                                                                       | 2                     |
| 1. | Leaves mostly alternate .....                                                               | 4                     |
| 2. | Branchlets glabrous, pruinose .....                                                         | <i>E. apodophylla</i> |
| 2. | Branchlets hairy .....                                                                      | 3                     |
| 3. | Petioles >4 mm long; buds 9-11 mm long; stamens white .....                                 | <i>E. ferruginea</i>  |
| 3. | Petioles <4 mm long; buds 19-40 mm long; stamens red or white .....                         | <i>E. setosa</i>      |
| 4. | Leaves (at least some) deltoid to broadly lanceolate or broadly ovate,<br>>50 mm wide ..... | 5                     |
| 4. | Leaves lanceolate or narrowly lanceolate; <50 mm wide .....                                 | 15                    |
| 5. | Buds usually ribbed .....                                                                   | 6                     |
| 5. | Buds usually smooth .....                                                                   | 7                     |

|     |                                                                          |                         |
|-----|--------------------------------------------------------------------------|-------------------------|
| 6.  | Inflorescence terminal; buds pedicellate, stamens red or white .....     | <i>E. ptychocarpa</i>   |
| 6.  | Inflorescence axillary; buds sessile, stamens orange .....               | <i>E. miniata</i>       |
| 7.  | Adult leaves scabrous .....                                              | <i>E. confertiflora</i> |
| 7.  | Adult leaves smooth .....                                                | 8                       |
| 8.  | Inflorescence axillary or clustered on old wood .....                    | 9                       |
| 8.  | Inflorescence a terminal panicle or corymb .....                         | 12                      |
| 9.  | Pedicels >10 mm long; flowers in irregular clusters .....                | 10                      |
| 9.  | Pedicels <10 mm long; flowers in axillary 7-flowered umbels .....        | 11                      |
| 10. | Bark rough in lower part of trunk; leaves dull; buds 14-44 mm long ..... | <i>E. clavigera</i>     |
| 10. | Bark smooth throughout; leaves shiny; buds 40-60 mm long .....           | <i>E. grandifolia</i>   |
| 11. | Buds 5-7 mm long .....                                                   | <i>E. tintinnans</i>    |
| 11. | Buds 8-14 mm long .....                                                  | <i>E. bigalerita</i>    |
| 12. | Leaves deltoid to $\pm$ orbicular; operculum conical .....               | <i>E. oligantha</i>     |
| 12. | Leaves lanceolate to broadly ovate; operculum saucer shaped .....        | 13                      |
| 13. | Bark rough bloodwood type throughout .....                               | <i>E. porrecta</i>      |
| 13. | Bark smooth on upper trunk and branches .....                            | 14                      |
| 14. | Buds 8-17 mm long, hypanthium abruptly constricted into pedicel .....    | <i>E. latifolia</i>     |
| 14. | Buds 12-30 mm long, pedicel tapering into hypanthium .....               | <i>E. foelscheana</i>   |
| 15. | Buds in threes, hypanthium distinctly 4-toothed .....                    | <i>E. tetradonta</i>    |
| 15. | Buds otherwise .....                                                     | 16                      |
| 16. | Adult leaves scabrous .....                                              | <i>E. confertiflora</i> |
| 16. | Adult leaves smooth .....                                                | 17                      |
| 17. | Flowers orange-red .....                                                 | <i>E. phoenicea</i>     |
| 17. | Flowers white .....                                                      | 18                      |
| 18. | Inflorescence a terminal panicle or corymb .....                         | 19                      |
| 18. | Inflorescence of axillary umbels or irregular clusters .....             | 29                      |
| 19. | Bark grey to brown, rough throughout .....                               | 20                      |
| 19. | Bark white and smooth, at least on branches .....                        | 26                      |
| 20. | Buds scurfy or scabrous .....                                            | <i>E. polycarpa</i>     |
| 20. | Buds smooth .....                                                        | 21                      |
| 21. | Buds >16 mm long .....                                                   | 24                      |
| 21. | Buds <13 mm long .....                                                   | 22                      |
| 22. | Bark grey or black, ironbark .....                                       | <i>E. jensenii</i>      |
| 22. | Bark otherwise .....                                                     | 23                      |
| 23. | Bark thick, fibrous, yellowish; leaves shiny .....                       | <i>E. jacobsoniana</i>  |
| 23. | Bark box type, grey; leaves dull .....                                   | <i>E. tectifica</i>     |
| 24. | Operculum $\pm$ equal in length to hypanthium; operculum conical .....   | <i>E. patellaris</i>    |
| 24. | Operculum shorter than hypanthium; operculum obtuse .....                | 25                      |
| 25. | Buds 10-23 mm long, trees to 35 m high; Tiwi islands .....               | <i>E. nesophila</i>     |
| 25. | Buds 22-28 mm long, trees to 8 m high; widespread in DR .....            | <i>E. porrecta</i>      |
| 26. | Buds <12 mm long .....                                                   | 27                      |
| 26. | Buds >12 mm long .....                                                   | 28                      |

|                                                                                                   |                          |
|---------------------------------------------------------------------------------------------------|--------------------------|
| 27. Buds 2.5-7 mm long .....                                                                      | <b>E. brachyandra</b>    |
| 27. Buds 8-12 mm long .....                                                                       | <b>E. dichromophloia</b> |
| 28. Buds pyriform; operculum saucer shaped, umbonate .....                                        | <b>E. foelscheana</b>    |
| 28. Buds ellipsoid; operculum conical .....                                                       | <b>E. bleeseri</b>       |
| 29. Inflorescence an axillary 7-flowered umbel .....                                              | <b>30</b>                |
| 29. Inflorescence an irregular cluster, flowers >7 per cluster .....                              | <b>33</b>                |
| 30. Trees of seasonally flooded areas, stream margins .....                                       | <b>31</b>                |
| 30. Trees of rocky ridges .....                                                                   | <b>32</b>                |
| 31. Buds 6-8(10) mm long .....                                                                    | <b>E. alba</b>           |
| 31. Buds 8-18 mm long .....                                                                       | <b>E. camaldulensis</b>  |
| 32. Operculum cupular .....                                                                       | <b>E. herbertiana</b>    |
| 32. Operculum narrowly conical to rostrate .....                                                  | <b>E. umbrawarrensii</b> |
| 33. Inflorescence on current seasons growth, bark smooth throughout or with short stocking .....  | <b>E. papuana</b>        |
| 33. Inflorescence on previous seasons wood, bark rough, tessellated or scaly on lower trunk ..... | <b>34</b>                |
| 34. Leaves >28 mm wide; petioles >13 mm long; buds 14-44 mm long .....                            | <b>E. clavigera</b>      |
| 34. Leaves <22 mm wide; petioles <12 mm long; buds 12-16 mm long .....                            | <b>E. kombolgiensis</b>  |

### **E. alba** Reinw. ex Blume

*E. alba* var. *australasica* Blakely & Jacobs

Evergreen *tree* to 12 m, rarely to 18 m; bark smooth and white throughout. Branchlets of juvenile and intermediate foliage glaucous, quadrangular; intermediate leaves broadly ovate, to 100 mm wide. Petioles 12-42 mm long. *Leaf* blades lanceolate, slightly falcate, (65)80-150(200) mm long, 14-60 mm wide, L/B 1.8-6(10). *Inflorescence* of 7-flowered umbels, solitary in leaf axils on current seasons shoots. Peduncles terete to angular, 5-10 mm long. *Buds* subglaucous, sessile or shortly pedicellate, ellipsoid or globular; 6-8(10) mm long, incl. pedicel, 3-6 mm wide. Operculum hemispherical,  $\pm$  equal to hypanthium in length, apiculate. Stamens white. *Capsule* sessile or with pedicels to 4(7) mm long; hypanthium hemispherical, 3-5 mm long, 5-7 mm wide; valves exsert. *Flowering*: July - Sept; fruiting: Aug - Oct. Fig. 49

Known from monsoonal Australia from the Kimberley to northern Qld; also in eastern Indonesia and New Guinea. In the DR *E. alba* occurs on creek lines on sandy soils overlying clay on the margins of the coastal plains.

### **E. apodophylla** Blakely & Jacobs

Evergreen *tree* to 18 m; bark smooth and white throughout. Branchlets pruinose, quadrangular. *Leaves* glaucous, opposite, sessile, cordate to amplexicaulous;

blades elliptic or lanceolate, 40-170 mm long, 25-65 mm wide, L/B 1.6-3.1. *Inflorescence* of solitary, axillary, 7-flowered umbels on current seasons growth. Peduncles 3-7 mm long. *Buds* glaucous, sessile or shortly pedicellate, globular, 4-8 mm long incl. pedicels, 4-5.8 mm wide; operculum hemispherical, apiculate. *Capsules* sessile or pedicels to 2.5 mm long; hypanthium obconical, 4-5 mm long, 4-6 mm wide; valves shortly exsert. *Flowering*: June - Oct; fruiting: Sept - Nov. Fig. 49

In scattered populations in the NT and the Kimberley. In the DR it forms pure stands on silty flats near Adelaide River township. *E. apodophylla* is one of the most attractive of the local species and has had some success in landscaping in Darwin.

### **E. bigalerita** F.Muell.

*Tree* to 17 m high; bark smooth and white or greyish white throughout, the new seasons bark bright orange. *Leaves* shiny; petioles 35-80 mm long; blades deltoid, 51-160 mm long, (50)80-150 mm wide, L/B 0.9-1.8. *Inflorescence* of 5-7-flowered solitary, axillary umbels on current seasons shoots. Peduncles stout, 5-10 mm long. *Buds* sessile or shortly pedicellate, globular to obovoid, 8-14 mm long, 7-11 mm wide; operculum hemispherical, rounded or apiculate. *Capsules* sessile or on pedicels to 1 mm long; hypanthium obconic, 8-10 mm long, 7-13 mm wide; valves exserted or level with rim. *Flowering*: July - Sept; fruiting: July - Oct. Fig. 49



Kimberley and the NT north of about Mataranka; in the DR more frequent in the southern parts where it occurs on moist flats. The species differs from *E. tintinnans* chiefly in the size of its parts which proves to be an unsatisfactory distinction for many specimens with intermediate features. Cultivated in Darwin, mainly in streets and parks.

### *E. bleeseri* Blakely

*Tree* to 20 m; bark smooth with brown and red persistent flakes on the trunk, white above. Petioles 8-21 mm long. *Leaf* blades shiny, narrowly lanceolate, 85-160 mm long, 10-21 mm wide, L/B 4.2-9.2. *Inflorescence* a terminal corymb. *Buds* on long pedicels, ellipsoid, 14-27 mm long, incl. pedicels, 6.6-7.5 mm wide; operculum conical. *Capsules* on pedicels 11-20 mm long; hypanthium  $\pm$  cylindrical, narrowing towards the rim, 14-18 mm long, 12-13 mm wide. Seed winged. *Flowering*: Aug; *fruiting*: June - Oct. Fig. 49

Kimberley to Arnhem Land. Common in the DR on shallow soils on gravelly rises. Easily recognised in the field by its shiny leaves.

### *E. brachyandra* F.Muell.

*Tree*, 2-5(8) m high, often with a gnarled and twisted trunk; bark rough, fibrous and wavy on the lower trunk, smooth and bronze coloured above. Branchlets glaucous. Petioles 9-18 mm long. *Leaf* blades discolorous, elliptic, broadly elliptic or lanceolate 30-75 mm long, 11-46 mm wide, L/B 1.2-3.1. *Inflorescence* a panicle in the outer axils; to 80 mm long. *Buds* 2.5-7 mm long, incl. pedicels, 2-2.5 mm wide; operculum hemispherical. *Capsules* on pedicels 1.5-3 mm long; hypanthium campanulate, 2-2.5 mm long, c. 2 mm wide, thin walled; valves included. *Flowering*: Oct; *fruiting*: Oct - Dec. Fig. 49

A sandstone species, occurring in the Kimberley and from the VRD to the Litchfield NP area. *E. brachyandra* has one of the smallest fruit in the genus; the fruit develop rapidly after flowering and soon dehisce and fall from the tree.

### *E. camaldulensis* Dehnh.

*Tree* to 18 m. Bark smooth and white to grey. Petioles 10-20 mm long. *Leaf* blades lanceolate, 100-220 mm long, 9-31 mm wide, L/B 4.2-20.

## Eucalyptus

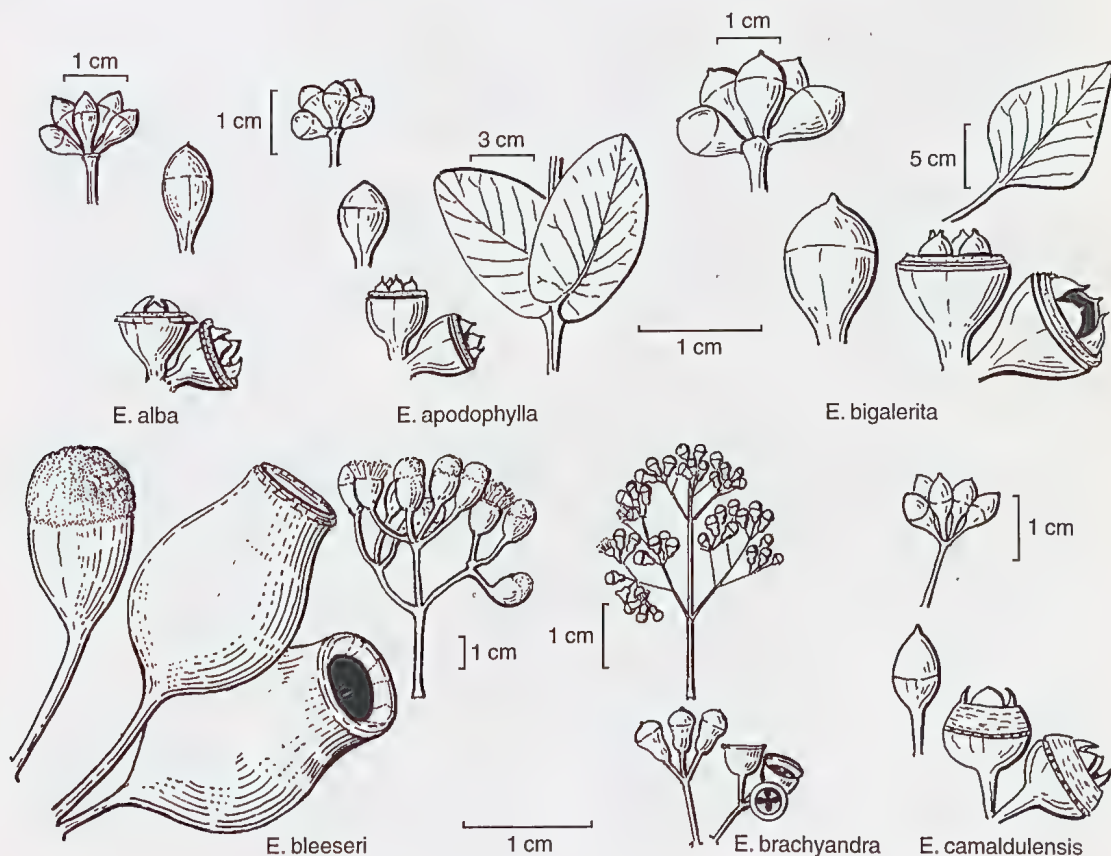


Fig. 49

*Inflorescence* of solitary axillary umbels on current seasons shoots. Peduncles 9-13 mm long. *Buds* on long pedicels, globular, 8-18 mm long incl. pedicels, 4-5.5 mm wide; operculum longer than the hypanthium, hemispherical, apiculate. *Capsules* on pedicels 5-8 mm long; hypanthium hemispherical, 2-3 mm long, 5-6.5 mm wide; valves strongly exsert. *Flowering*: Mar - Sept; fruiting: most months. Fig. 49

#### River Red Gum

A common species on watercourses in inland Australia and the most widespread of all eucalypts, occurring in all mainland states. Not common in the DR. Used extensively in landscaping in Darwin. The form found in the DR differs from the subtropical and temperate forms in having a shorter operculum.

#### *E. clavigera* A.Cunn. ex Schauer

*Tree* to 10(18) m, deciduous; bark grey and neatly tessellated on the lower trunk, smooth and white above. *Leaves* opposite or alternate; petioles 13-30 mm long; blades dull, concolorous, lanceolate or broadly lanceolate, 85-220 mm long, 28-70(90) mm wide, L/B (1.8)3-8.2. *Inflorescence* on last seasons wood, consisting of a series of contracted panicles of many flowered umbels. *Buds* on long pedicels, clavate to campanulate, 14-44 mm long incl. pedicels, 4.6-6.3 mm wide; operculum saucer shaped, rounded. *Capsules* on pedicels 10-30 mm long; hypanthium obscurely striate, truncate-ovoid, 8-16 mm long, 4-10 mm wide. Seed saucer shaped. *Flowering*: Sept - Nov; fruiting: Oct - Nov. Fig. 50

Distributed from the Kimberley to eastern Arnhem Land. Widespread in the DR on a variety of well drained soils. The species drops its leaves in late July and immediately flushes with wine red foliage which turns green in a few days; flower buds are produced about the same time.

#### *E. confertiflora* F.Muell.

*Tree* to 12 m high, often with a broadly spreading crown; deciduous; bark neatly tessellated on lower trunk, smooth and white above. Branchlets glabrous or softly hairy or scabrous. Intermediate leaves petiolate, cordate, broadly ovate, with blades to 290 mm long, to 300 mm wide. Petioles 0-17(30) mm long. *Leaf* blades concolorous, scabrous, cordate or obtuse at base, broadly lanceolate, narrowly lanceolate or elliptic, 35-185 mm long, (20)32-85(140) mm wide, L/B 1.4-3.6. *Inflorescence* on last seasons (? or older) wood, "clavigera" type. *Buds* long pedicellate, clavate to campanulate, 15-25 mm long incl. pedicel, 4-6 mm wide; operculum saucer shaped, rounded. *Capsules* on pedicels (6)13-25 mm long; hypanthium

truncate-ovoid or ellipsoid, obscurely striate, 8-12 mm long, 6-10 mm wide. Seed saucer shaped. *Flowering*: June - Nov; fruiting: July - Dec. Fig. 50

Tropical Australia and New Guinea. Reasonably common in woodland communities in the southern part of the DR. *E. confertiflora* is characterised by its heavy flowering towards the end of the Dry season, often when still leafless.

#### *E. dichromophloia* F.Muell.

*Tree* to 9 m, deciduous; bark smooth, white, usually with red and brown persistent flakes on the trunk. Petioles 10-22 mm long. *Leaf* blades lanceolate, 60-150 mm long, 13-50 mm wide, L/B 2.8-8.4. *Inflorescence* a terminal corymb. *Buds* pedicellate, globular or slightly obovoid, 8-12 mm long incl. pedicel, 3-5 mm wide; operculum saucer shaped, apiculate. *Capsules* on pedicels 2-5 mm long; hypanthium urceolate, rarely cylindrical, 6-8 mm long, 6-7 mm wide. Seed winged. *Flowering*: Mar - Apr; fruiting: May - July. Fig. 50

Confined to the NT north of Katherine where it occurs in woodlands on skeletal soils. Not common in the DR; may be seen in the woodlands on the low hills just north of Pine Creek.

#### *E. ferruginea* Schauer

*Tree* to 12 m, usually smaller; bark bloodwood type to the outer branches; branchlets and new leaves scabrous with mustard to rusty coloured hairs, becoming glabrous with age. *Leaves* ± opposite; petioles (0)4-6(20) mm long; blades elliptic or broadly lanceolate, 60-140 mm long, 30-60(100) mm wide, L/B 1.2-2.8, the base cordate or rarely obtuse, apex obtuse to acute, usually mucronate. *Inflorescence* a terminal panicle with branchlets, buds and young fruit scabrous hairy. *Buds* sessile or shortly pedicellate, obconic, 9-11 mm long incl. pedicel, 7-8 mm wide; operculum saucer shaped, ± apiculate. *Capsules* on stout pedicels 1-3(6) mm long; hypanthium urceolate, sometimes globular, 13-35 mm long, 11-23 mm wide; valves deeply sunken. Seed winged. *Flowering*: Dec - June, mostly in Jan and Feb; fruiting: Apr - Oct. Fig. 50

Distributed from the Kimberley to Arnhem Land but restricted to the southern part of the DR. A species of sandy soils.

#### *E. foelscheana* F.Muell.

*Tree* to 10 m, usually smaller; bark smooth throughout with flakes of bark persisting at least on the lower trunk. Intermediate leaves to 210 mm wide.



Petioles 15-37 mm long. *Leaf* blades dull, concolorous, lanceolate to broadly lanceolate, 105-175 mm long, 40-90 mm wide, L/B 1.4-3.2. *Inflorescence* a terminal corymb. *Buds* pedicellate, pyriform, 12-30 mm long incl. pedicel, 5-8 mm wide; operculum saucer shaped, umbonate. *Capsules* on pedicels 3-13 mm long; hypanthium usually smooth, urceolate, 16-27 mm long, 13-19 mm wide. Seed winged. *Flowering*: Nov - Oct; fruiting: May - Oct. Fig. 50

Widespread from the Kimberley to Arnhem Land with some records from northern Qld. In the DR common in a variety of habitats, particularly woodland and open woodland on shallow soils. The species described here includes *E. darwinensis* Carr & Carr and *E. kakadu* Carr & Carr.

### *E. grandifolia* R.Br. ex Benth.

*Tree* to 15 m, deciduous; bark smooth and white throughout, rarely with a short stocking of persistent flakes. Leaves of reversion shoots scabrous. Adult *leaves* alternate or opposite; petioles 10-26 mm long; blades shiny, leathery; broadly lanceolate, broadly elliptic or lanceolate, 100-175 mm long, 35-110 mm wide, L/B 1.4-2.4. *Inflorescence* of "clavigera" type, usually on old wood. *Buds* with long pedicels, campanulate, 40-60 mm long incl. pedicel, 9-11 mm wide; operculum saucer shaped, rounded or apiculate. *Capsules* on pedicels 17-60 mm long; hypanthium often striate, suburceolate or almost cylindrical, 14-18 mm long, 10-13 mm wide. Seed saucer shaped. *Flowering* and fruiting: July - Oct. Fig. 50

Infrequent in the DR; more common south of about 14°S where it extends from the Kimberley to the Gulf of Carpentaria. Habitat preference is for run-on areas with slightly impeded drainage.

### *E. herbertiana* Maiden

*Tree* or mallee to 8 m; bark smooth and white throughout, new bark salmon coloured. Petioles 10-18 mm long. *Leaf* blades concolorous, narrowly lanceolate or lanceolate, 62-160 mm long, 8-33 mm wide, L/B 4-16. *Inflorescence* of axillary umbels on current seasons growth. Peduncles 6-13 mm long. *Buds* sessile or shortly pedicellate, ellipsoid, 6-12 mm incl. pedicel, 2.7-4.5 mm wide; operculum cupular, about equal in length to hypanthium, acute. *Capsules* on pedicels 0-4 mm long; hypanthium hemispherical to obconic, 2.5-5 mm long, 4-6 mm wide; valves strongly exsert, 2-2.5 mm long. *Flowering*: Aug - Dec; fruiting: all months. Fig. 50

On sandstone from the Kimberley to the Qld Gulf. In the DR recorded from Litchfield NP. This species

has become popular in amenity plantings in Darwin because of its small size and bright orange new bark.

### *E. jacobsiana* Blakely

*Tree* to 10 m, rarely to 18 m; rhizomatous. Bark yellow-brown, fibrous throughout. Petioles 6-12 mm long. *Leaf* blades discolorous, shiny above, narrowly lanceolate, 36-120 mm long, 7-21 mm wide, L/B 4.2-15. *Inflorescence* a terminal corymb. *Buds* pedicellate, obconic, 8-13 mm long incl. pedicel, c. 3 mm wide; operculum saucer shaped, apiculate. *Capsules* on pedicels 3-6 mm long; hypanthium grey-mottled, urceolate, 7-11 mm long, 5-9 mm wide; valves deeply sunken. Seeds wingless. *Flowering*: Dec; fruiting: June - Sept. Fig. 50

An NT endemic; relatively common in Arnhem Land. In the DR it is known from laterite-capped plateaus just north of Pine Creek and near Tipperary Station.

### *E. jensenii* Maiden

*Tree* to 12 m, deciduous; bark black or grey, persistent, deeply furrowed. Petioles 4-12 mm long. *Leaf* blades concolorous, often glaucous, lanceolate to broadly lanceolate or elliptic, 45-110 mm long, 10-35 mm wide, L/B 1.7-5.5, obtuse. *Inflorescence* a terminal panicle with solitary umbels in the upper axils. *Buds* sessile or shortly pedicellate, ellipsoid, 4-8 mm long incl. pedicel, 2.6-4.2 mm wide; operculum hemispherical, rounded. *Capsules* on pedicels 0-5 mm long; hypanthium hemispherical or ovoid, 2-6 mm long, 2.5-5 mm wide; valves slightly exsert. *Flowering*: Mar - May; fruiting: May - Oct. Fig. 50

#### Ironbark

Disjunctly distributed from the Kimberley to Groote Eylandt; on a variety of habitats from clay plains to rocky ridges. In the DR *E. jensenii* can be seen on the crests of the hills south of Adelaide River township and near Mt Bunday. It is the only true ironbark in the NT.

### *E. kombolgiensis* Brooker & Dunlop

*Tree* to 10 m; bark mostly smooth with a short stocking of thin flaky bark (not neatly tessellated) on lower trunk. Intermediate leaves scabrous hairy, broadly lanceolate. Petioles 5-12 mm long. *Leaf* blades concolorous, narrowly lanceolate, 50-180 mm long, 5-22 mm wide, L/B 4-12.8. *Inflorescence* "clavigera" type, on last seasons wood. *Buds* pedicellate, clavate, 12-16 mm long incl. pedicel, 3-4.5 mm wide; operculum saucer shaped, rounded. *Capsules* on pedicels 9-16 mm long; hypanthium suburceolate or ovoid, 5.5-9 mm long, 5-7 mm wide; valves sunken. *Flowering*: Oct - Nov; fruiting: Oct - Dec. Fig. 51



Eucalyptus

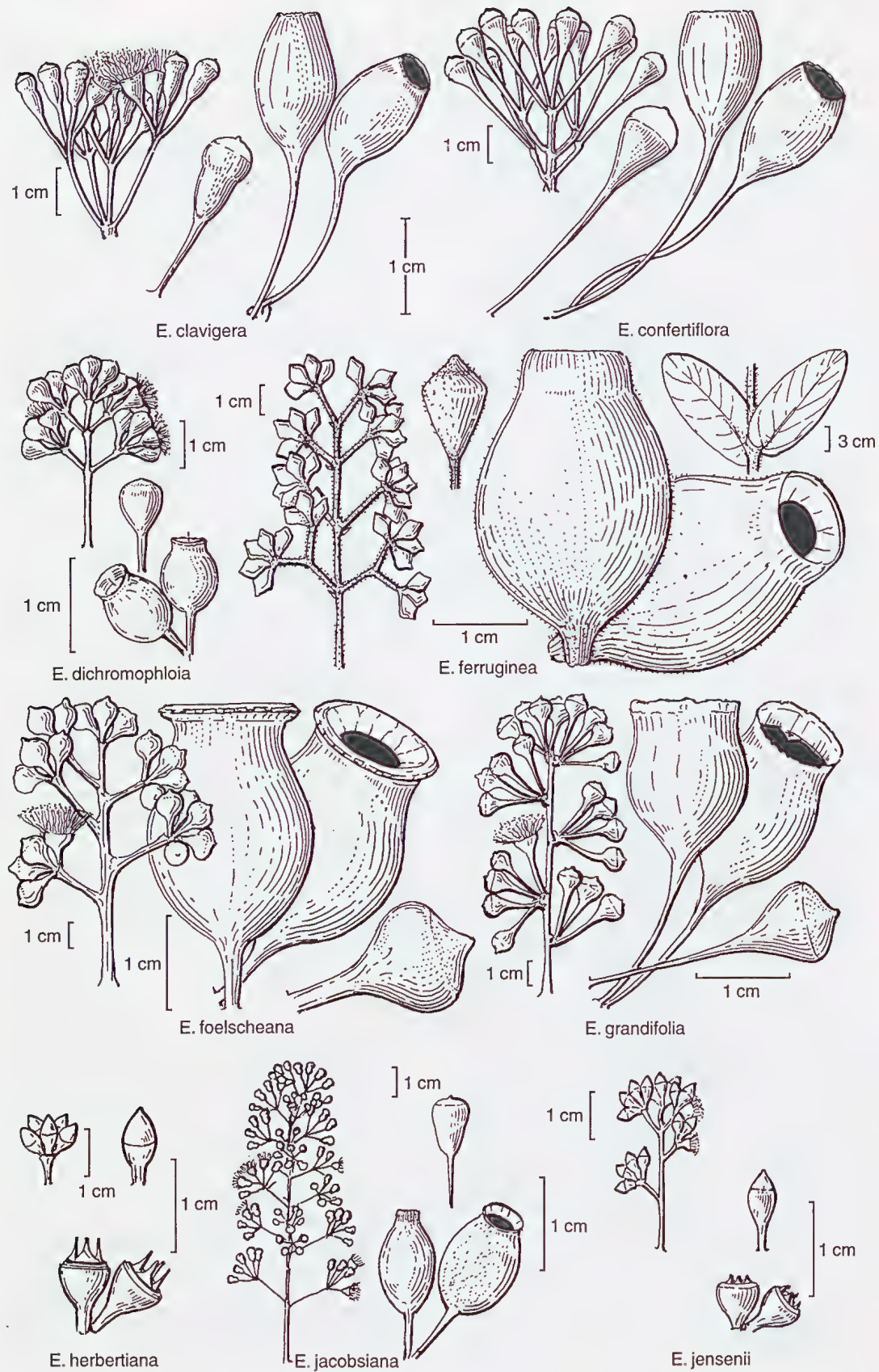


Fig. 50

NT endemic, usually on sandstone or on adjacent sandy soils. A common species in the Alligator Rivers region, extending to the Gulf of Carpentaria. In the DR it can be seen on sandstone at George Ck and in Litchfield NP.

**E. latifolia** F.Muell.

*Tree* to 10 m, rarely taller; bark smooth in the upper trunk and branches with red-brown flakes persistent in lower trunk, sometimes extending to upper branches. Petioles 22-40 mm long. *Leaf* blades concolorous, dull, broadly lanceolate to broadly ovate, 90-160 mm long, 56-100 mm wide, L/B 1.2-2.7. *Inflorescence* a terminal corymb. *Buds* on long pedicels, obovoid, 8-17 mm long incl. pedicel, 3.5-5.3 mm wide; operculum saucer shaped, apiculate. *Capsules* on pedicels 3-8 mm long; hypanthium mottled grey, ovoid or urceolate, 9-15 mm long, 8-13 mm wide; valves sunken. Seed winged. *Flowering*: Sept - Feb; fruiting: May - Sept. Fig. 51

A common woodland species of the Kimberley and the Top End. It is found in a variety of habitats including run-on areas which are waterlogged during parts of the Wet season.

**E. miniata** A.Cunn. ex Schauer

*Tree* to 30 m, usually 20 m or less; bark dark red, thick, flaky on trunk, smooth and white on upper trunk and limbs; branchlets, buds and fruits pruinose. Juvenile leaves opposite for many pairs, scabrous with rusty hairs. Adult *leaves* alternate; petioles 8-32 mm long; blades discolorous, lanceolate, occasionally elliptic, 60-150 mm long, 13-57 mm wide, L/B 1.9-4(5.5). *Inflorescence* of solitary, many flowered umbels in axils of current seasons leaves; peduncles usually stout, often flattened, 16-35 mm long. *Buds* sessile, pyriform, faintly to prominently ribbed or winged, 15-23 mm long, 7-14 mm wide, operculum hemispherical; stamens orange-red. *Capsules* angular and ribbed, ovoid or suburceolate, 29-44 mm long, 17-30 mm wide; valves sunken. *Flowering*: May - July; fruiting: Sept - Nov. Fig. 51

**Woolly Butt**

This species is one of the dominants in savanna communities across its range from the Kimberley to Cape York. Flower colour is consistent but there is some variation in fruit size and degree of ribbing in the buds. Trees in the DR rarely develop the striking waxy white branchlets, buds and fruit to the degree seen in drier areas. A large fruited, narrow leaved form, *E. gigantangion* L.Johnson & K.Hill, occurs on the sandstone in the Alligator Rivers region.

*E. miniata* and the closely related *E. phoenicea*, when suppressed as lignotuberous seedlings on the forest floor produce a series of prostrate stems; one erect stem will eventually dominate when a gap occurs in the canopy.

**E. nesophila** Blakely

*Tree* to 35 m; bark bloodwood type throughout. Juvenile leaves opposite or in whorls of three, coarsely hairy, broadly lanceolate, cordate, petiolate, blades 80-140 mm long, 50-80 mm wide. Petioles of adult *leaves* 9-17 mm long; blades falcate, narrowly lanceolate, 95-195 mm long, 9-17(25) wide, L/B 4-16. *Inflorescence* a terminal corymb. *Buds* obconic, 10-23 mm long incl. pedicel, 4-5.5 mm wide; operculum saucer shaped, umbonate. *Capsules* on pedicels 4-8 mm long; hypanthium mottled, urceolate, 10-13 mm long, 6-9 mm wide; valves sunken. Seeds winged. *Flowering*: mainly June - July; fruiting: July - Sept. Fig. 51

**Melville Island Bloodwood**

Recorded disjunctly from the Mitchell Plateau (WA) to the tip of Cape York; usually on lateritic soils. A common species on Bathurst and Melville Is. The only other known occurrence of the species in the NT is on Cobourg Peninsula.

**E. oligantha** Schauer

*Tree* to 15 m; bark dark brown, rough, box type throughout. Petioles 30-70 mm long; *Leaf* blades concolorous, shiny, deltoid to almost orbicular, rarely lanceolate, 50-150 mm long, 25-140 mm wide, L/B 0.8-2.7, obtuse. *Inflorescence* a terminal panicle. *Buds* pedicellate, 10-14 mm long, 4-5 mm wide, ellipsoid; operculum conical. *Capsules* on pedicels 3-12 mm long; hypanthium cylindrical to truncate ovoid, 6-10 mm long, 5-8 mm wide; valves level or slightly exserted. *Flowering*: Sept; fruiting: all year. Fig. 51

Distributed from the Kimberley to eastern Arnhem Land. Not common in the DR. Usually on sites which are flooded periodically during the Wet season on silty or clayey soils. In the Mt Bunday area it has been recorded from ridge tops on skeletal soils.

**E. papuana** F.Muell.

*Tree* to 15 m; bark smooth and white throughout or with a short stocking (not neatly tessellated). *Leaves* alternate, dull; petioles 5-16 mm long; blades lanceolate or narrowly lanceolate, margins often undulate, 60-160 mm long, 12-48 mm wide, L/B 2.6-8. *Inflorescence* on current years shoots, a reduced "clavigera" type with few flowers. *Buds* pedicellate,



clavate, 9-15 mm long incl. pedicel, 4-5 mm wide; operculum shallow, rounded. *Capsules* on pedicels 2-5 mm long; hypanthium cylindrical, sometimes suburceolate, striate, 9-12 mm long, 6-9 mm wide. Seed saucer shaped. *Flowering*: July - Nov; *fruiting*: Aug - Nov. Fig. 51

#### Ghost Gum

Under the name *E. papuana* there are a number of taxa ranging from New Guinea to central Australia. The description here is confined to a taxon which is distinguished by having typically long thin leaves with undulate margins. The preferred habitat is on stream levees, on the edges of swamps and billabongs and on the open grassy areas fringing the coastal floodplains.

#### *E. patellaris* F.Muell.

*Tree* to 14 m; bark grey, rough throughout. Petioles 7-15 mm long. *Leaf* blades concolorous, falcate, narrowly lanceolate to lanceolate, 105-245 mm long, 14-45 mm wide, L/B (3.2)5-16. *Inflorescence* a terminal panicle. *Buds* pedicellate, fusiform, 16-25 mm long incl. pedicel, 6.5-9 mm wide; operculum conical or  $\pm$  hemispherical, equal to or slightly shorter than the hypanthium, the base broader than the hypanthium, abruptly tapering to the apex. *Capsules* on pedicels 2-14 mm long; hypanthium campanulate, obconic or almost cylindrical, 6-11 mm long, 7-12 mm wide; valves exsert, rarely sunken; disc usually prominent and horizontal but variable. *Flowering*: Dec - Feb; *fruiting*: Mar - Sept. Fig. 51

Distributed in disjunct populations from the Carnarvon area, WA, to Cape York. Not common in the DR; more common south of Pine Creek; on various soil types.

#### *E. phoenicea* F.Muell.

*Tree* to 12 m, often multistemmed; bark thick, yellowish and flaky on trunk and main branches, smooth above. Petioles 8-19 mm long. *Leaf* blades concolorous, lanceolate to narrowly lanceolate, 65-145 mm long, 10-35 mm wide, L/B 2.5-6. *Inflorescence* a series of many flowered umbels; peduncles 14-30 mm long. *Buds* pedicellate, clavate, smooth, 13-22 long incl. pedicel, 4.7-7.1 mm wide; operculum hemispherical to conical; stamens orange-red. *Capsules* on pedicels 3-12 mm long; hypanthium striate, finely mottled with a slight sheen, elongate-urceolate, 17-27 mm long, 7-12 mm wide; valves 2, deeply sunken. *Flowering*: May - Aug; *fruiting*: Aug - Nov. Fig. 51

#### Scarlet Gum

Distributed from the Kimberley to Cape York. In the DR on granitic soils near Batchelor and on sandstone near the Mary R. A desirable species for culti-

vation because of its attractive flowers, its relatively small stature and ability to thrive in shallow soils.

#### *E. polycarpa* F.Muell.

*Tree* to 17 m; bark grey, bloodwood type throughout. Petioles 8-20 mm long. *Leaf* blades slightly shiny, falcate, narrowly lanceolate, 75-170 mm long, 11-26 mm wide, L/B 4.2-8.3. *Inflorescence* a terminal corymb. *Buds* on long pedicels, grey-scurfy, obconic, 11-25 mm long incl. pedicel, 5-6.5 mm wide; operculum conical. *Capsules* on pedicels 4-9 mm long; hypanthium mottled, slightly scabrous, elongated urceolate, 14-30 mm long, 9-13 mm wide; valves sunken. Seed winged. *Flowering*: Mar - July; *fruiting*: June - Oct. Fig. 52

Tree of moist habitats from the northern coast of WA to Cape York; common in the DR.

#### *E. porrecta* S.T.Blake

*Tree* to 8 m; bark dark grey, rough bloodwood type throughout. Intermediate leaves concolorous, broadly ovate, to 200 mm long and 160 mm wide. Petioles 12-25 mm long. *Leaf* blades concolorous, broadly lanceolate or lanceolate, 110-230 mm long, 26-75 mm wide, L/B 2.1-6.7. *Inflorescence* a terminal corymb. *Buds* clavate, 22-28 mm long incl. pedicels, 7-10.5 mm wide; operculum saucer shaped, rounded. *Capsules* on pedicels 3-17 mm long; hypanthium urceolate, 19-28 mm long, 16-26 mm wide. Seed winged. *Flowering*: Jan - Mar; *fruiting*: May - Aug. Fig. 52

An NT endemic, confined to the Darwin-Alligator Rivers region. A species of the savanna where it occurs in the mid stratum.

#### *E. ptychocarpa* F.Muell.

*Tree* to 12 m, sometimes taller; bark dark grey to black, bloodwood type throughout, becoming shaggy. Juvenile leaves shiny, discolorous, often peltate, broadly lanceolate, to 420 mm long and 250 mm wide. Petioles 17-38 mm long. *Leaf* blades discolorous, broadly lanceolate, rarely broadly ovate or narrowly lanceolate, 125-320 mm long, 28-97 mm wide, L/B 1.8-7.2. *Inflorescence* a terminal corymb. *Buds* grey scurfy, faintly to strongly ribbed, rarely smooth, clavate, 34-60 mm long incl. pedicel, 13-18 mm wide; operculum conical to cupular; stamens pink, red or white. *Capsules* on pedicels 5-30 mm long; hypanthium faintly to strongly ribbed, rarely smooth, cylindrical, slightly urceolate, rarely ovoid, 26-45 mm long, 19-30 mm wide. Seed winged. *Flowering*: Feb - June; *fruiting*: June - Nov. Fig. 52

#### Swamp Bloodwood



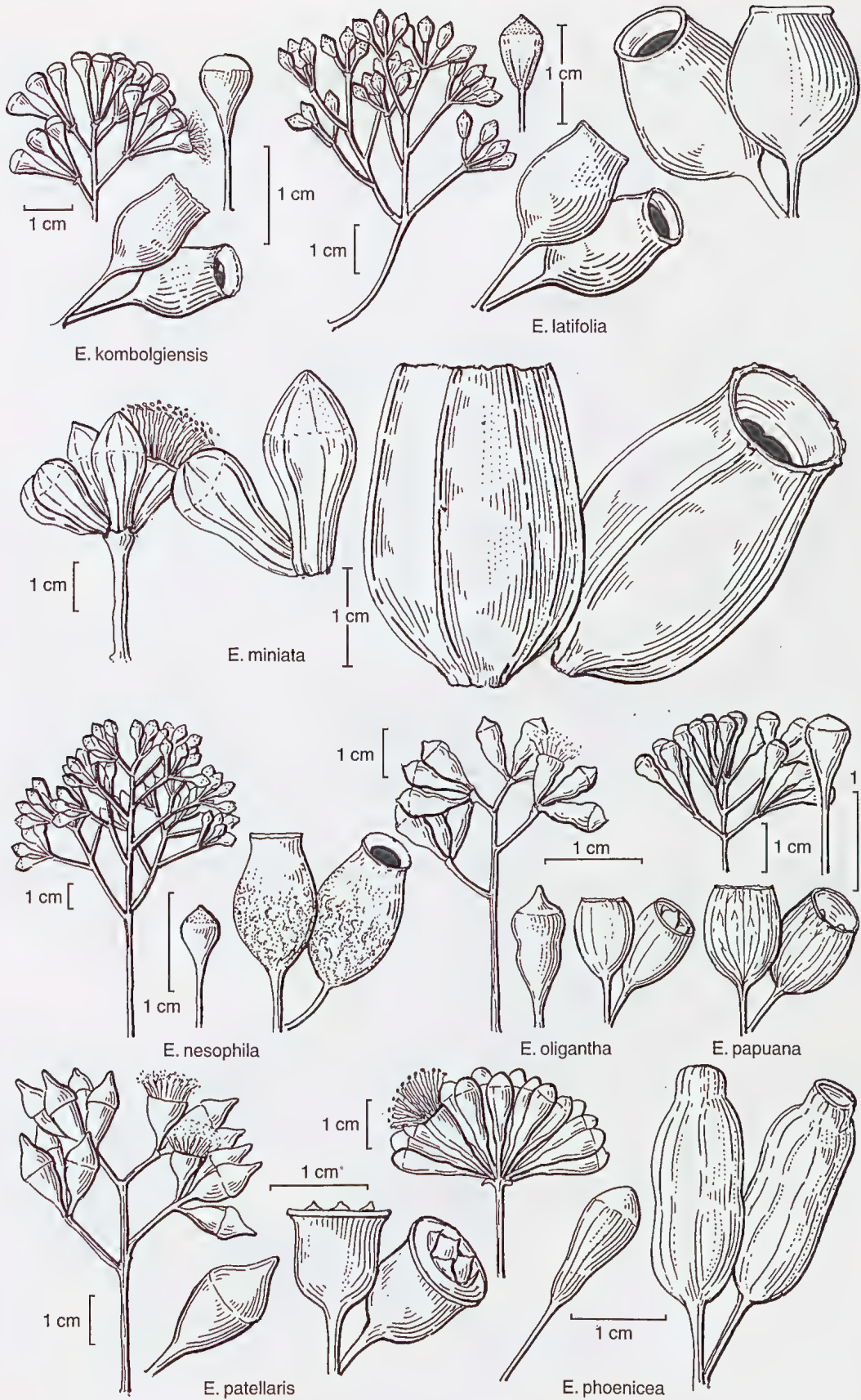


Fig. 51

Distributed from the Kimberley to the Gulf of Carpentaria in perennially moist sites in sandy soils. Ribbing of the fruit appears to be more accentuated in plants from drier regions; plants native to the DR have relatively smooth fruit. *E. erubescens* Carr & Carr is a hybrid between this species and *E. polycarpa*. Widely cultivated.

#### *E. setosa* Schauer

Crooked *tree* to 5 m, rarely taller; bark brownish, bloodwood type throughout. Branchlets, leaves, buds and young fruit usually coarsely rusty or yellowish hairy or bristly, leaves sometimes glabrous and subglaucous. *Leaves* opposite; petioles 0-4 mm long; blades lanceolate, broadly lanceolate, elliptic, cordate, 37-150 mm long, 20-92 mm wide, L/B c. 1.2. *Buds* obconic to campanulate, 19-40 mm long incl. pedicel, c. 10 mm wide; operculum shallow, aristate; stamens red, pink or white. *Capsules* on pedicels 2-15 mm long; hypanthium mottled, becoming glabrous, urceolate or globose, 22-34 mm long, 20-30 mm wide. Seed winged. *Flowering* and fruiting: all months. Fig. 52

*E. setosa* as understood at present is a composite of taxa ranging in fruit size, leaf size, shape and degree of hairiness and extending from northern WA to Cape York. The large fruited form described here is found from Darwin to Pine Creek on sandy or skeletal soils.

#### *E. tectifica* F.Muell.

*Tree* to 12 m high, deciduous or partly so; bark box type throughout. Petioles 10-20(30) mm long. *Leaf* blades concolorous, green or glaucous, narrowly lanceolate to lanceolate, 54-190 mm long, 13-35(50) mm wide, L/B 2.5-8(13). *Inflorescence* a terminal panicle. *Buds* ellipsoid, 6-12 mm long incl. pedicel, 3-4.3 mm wide; operculum conical, apiculate. *Capsules* on pedicels 0-3.5 mm long; hypanthium thin walled, hemispherical to obconic, 4-8 mm long, 4-7 mm wide; valves sunken or the tips exserted. *Flowering* and fruiting: Nov - Dec though often irregular. Fig. 53

Distributed from the Kimberley to the Gulf of Carpentaria, Qld. In the DR it occurs in woodland on a variety of sites though usually favouring skeletal soils.

#### *E. tetradonta* F.Muell.

*Tree* to 30 m, usually less; bark grey, persistent, fibrous throughout. *Leaves* alternate, occasionally opposite; petioles 11-20 mm long; blades concolorous, falcate, lanceolate, 75-250 mm long, 10-53 mm wide,

L/B 4.2-11.7. *Inflorescence* of solitary axillary 3-flowered umbels or occasionally forming a short terminal panicle; peduncles 7-26 mm long. *Buds* clavate or pyriform with 4 prominent sepaline teeth at the summit of the hypanthium, persisting in fruit; 10-22 mm long incl. pedicel, 7-11 mm wide; operculum hemispherical, rounded, 4-8-ribbed. *Capsules* on pedicels 0-6 mm long; hypanthium ovoid to campanulate, 10-20 mm long, 9-14 mm wide; valves  $\pm$  level with orifice. *Flowering*: June - Oct; fruiting: Sept - Oct. Fig. 53 **Darwin Stringybark.**

Distributed from the Kimberley to Cape York. With *E. miniata*, a dominant species in open forest on well drained soils. One of only two species in the genus which reproduces by root suckers.

#### *E. tintinnans* (Blakely & Jacobs) L.A.S. Johnson & K.D. Hill

*Tree*, often deciduous, 3-12 m high; bark smooth, bright orange when newly exposed, becoming greyish white. Petioles 22-45 mm long. *Leaf* blades broadly lanceolate, ovate or deltoid to almost orbicular, (50)75-125 mm long, 35-75 mm wide, L/B 1-3. *Inflorescence* of 7-flowered umbels solitary in current seasons leaf axils. *Buds* sessile or shortly pedicellate, globular, 5-7 mm long, incl. pedicels, 4-5.2 mm wide; operculum hemispherical, rounded or rarely minutely apiculate. Peduncles terete, 4-8 mm long. *Capsules* sessile or on pedicels to 4 mm long; hypanthium  $\pm$  hemispherical, 3-4 mm long, 5-6 mm wide; valves exsert. *Flowering*: July - Aug; fruiting: Aug - Oct. Fig. 53

Endemic to the NT. In the DR on rocky ridges at the Mary R. and on similar sites from Batchelor southwards. Formerly known in Darwin as *E. alba* and cultivated under this name.

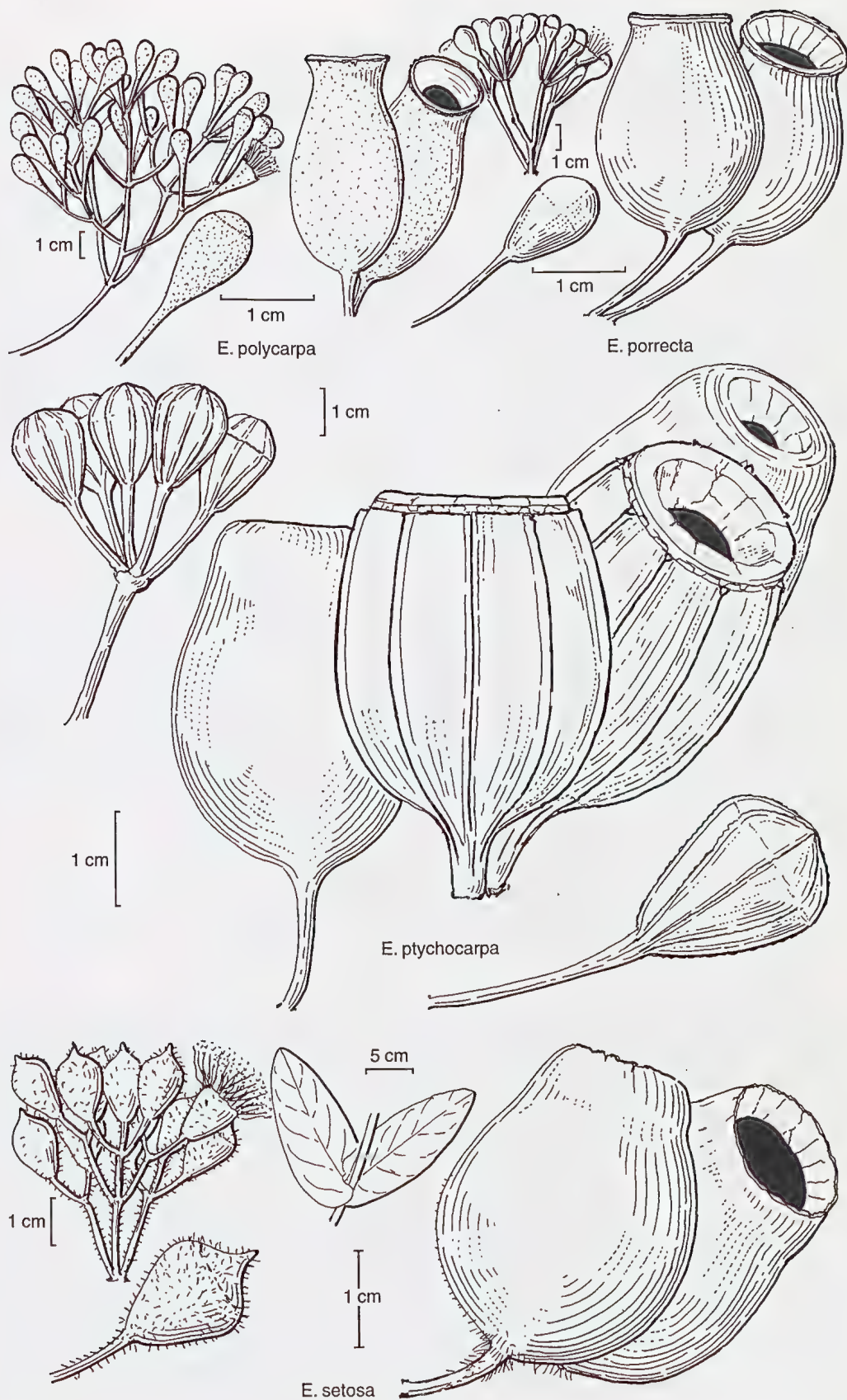
#### *E. umbrawarrensis* Maiden

*Tree* to 8 m, rarely taller; bark smooth and white throughout, peeling to pale orange. Petioles 9-18 mm long. *Leaf* blades concolorous, shiny, narrowly lanceolate to lanceolate, 40-110 mm long, 6-32 mm wide, L/B 4-9. *Inflorescence* of solitary axillary 7-flowered umbels; peduncles 6-8 mm long. *Buds* fusiform, 8-9 mm long incl. pedicel, 2.5-3.5 mm wide; operculum equal to hypanthium in length, narrowly conical to rostrate. *Capsules* on pedicels 1-4 mm long; hypanthium cupular or hemispherical, 3-4.5 mm long, 3-4.5 mm wide; valves triangular with fine exserted fragile tips. *Flowering*: Jan - Feb; fruiting: Feb - Oct. Fig. 53

NT endemic. Rare in the DR; on sandstone ridges in the Pine Creek area.



# Eucalyptus





## LEPTOSPERMUM J.R.Forst. & G.Forst.

An essentially Australian genus of c. 80 species with 1 species in the NT. [Thompson, 1989; Bean, 1992].

### **L. madidum** A.R.Bean subsp. **sativum** A.R.Bean

*L. longifolium* (C.T.White & W.D.Francis) S.T.Blake

*L. parviflorum* Veleton, misapplied name

Evergreen shrub or tree 2-9 m high; trunk fluted and twisted in large trees; bark smooth. Branchlets pendulous; new shoots sparsely sericeous, the foliage soon glabrous. Petioles c. 1 mm long. Leaf blades slightly bifacial, linear or very narrowly elliptic, 8-70 mm long, 1-6 mm wide, L/B 8-26, acute. Flowers few together on short shoots in the outer axils. Hypanthium campanulate, c. 2 mm

long, pubescent. Sepals persistent, triangular, c. 1 mm long, pubescent. Petals white, deciduous, ± orbicular, c. 2 mm long. Stamens short, spaced, in a single series. Ovary 3-locular. Fruit a capsule 4-5 mm wide. Flowering: July - Oct; fruiting: Sept - Nov. Fig. 53

### **Weeping Tea Tree**

Kimberley to the Top End. In the DR in the Darwin R.- Litchfield NP area. A rheophyte growing in seasonal, but perennially moist, stream beds or on stream margins in sandy soils. Common in cultivation in Darwin.

## LOPHOSTEMON Schott

Evergreen trees; milky sap present in young shoots. Leaves alternate. Inflorescence an axillary dichasium. Hypanthium campanulate; perianth 5-merous. Sepals persistent (in DR spp.). Petals white, deciduous. Stamens in more than 1 series, in 5 bundles opposite the petals. Ovary half inferior, 3-locular; placentation axile or pseudoaxile. Fruit a capsule.

Four species in northern Australia with one of the east coast species extending to New Guinea; 2 species in the NT. [Wilson & Waterhouse, 1982]

Brush Box (*L. confertus* (R.Br.) Peter Wilson & J.T.Waterh.) of the east coast is an important timber species; *L. lactifluus* has in the past been cut on Melville Is. for furniture making.

- |                                                                                                     |                        |
|-----------------------------------------------------------------------------------------------------|------------------------|
| 1. Mature leaves usually minutely tomentose below; bark hard, fissured; petioles 3-21 mm long ..... | <b>L. grandiflorus</b> |
| 1. Mature leaves glabrous or glabrescent; bark papery; petioles 20-45 mm long .....                 | <b>L. lactifluus</b>   |

### **L. grandiflorus** (Benth.) Peter Wilson & J.T.Waterh.

*Tristania grandiflora* (Benth.) Cheel

Tree 5-11 m high; bark grey, hard, fissured. Leaves and branchlets densely and minutely pubescent, upper surface of leaves becoming glabrescent; petioles 3-21 mm long; blades bifacial, leathery, oblong, obovate or elliptic, 43-140 mm long, 15-47 mm wide, L/B 1.9-4.1, acute or obtuse. Inflorescence on current seasons shoots, 15-40 mm long. Hypanthium ribbed, 4-5 mm long, pubescent. Sepals persistent, semicircular, 2-3 mm long, pubescent. Petals white, ± orbicular, 4-5 mm long. Staminal bundles broad based, 4-5 mm long. Fruit campanulate, 5-11 mm wide. Flowering and fruiting: most months. Fig. 53

Distributed from the Kimberley to coastal Qld;

not common in the DR. A species of seasonal streams and swamps. Two subspecies, based on a discontinuity in various floral characters, are recognised by Wilson & Waterhouse (1982).

### **L. lactifluus** (F.Muell.) Peter Wilson & J.T.Waterh.

*Tristania lactiflua* F.Muell.

Tree 5-15 m high; rhizomatous, forming dense clonal patches; bark brown, papery, flaky. Young leaves silky hairy, soon glabrous; petioles 20-45 mm long; blades bifacial, elliptic or lanceolate, 68-174 mm long, 13-94 mm wide, L/B 1.6-3.3, the upper surface slightly glossy, obtuse. Inflorescence usually much branched, 30-40 mm long. Hypanthium c. 2 mm long, glabrous or rarely tomentose. Sepals c. 1 mm long, glabrous or tomentose. Petals

orbicular, c. 4 mm long, glabrous. *Staminal* bundles c. 3 mm long. *Fruit* 4-5 mm wide. *Flowering* and *fruiting*: mainly July - Nov. Fig. 53

Endemic to the Top End of the NT. In the DR on the margins of creeks and billabongs in which the soils are moist, at least at depth, throughout the year.

## Eucalyptus

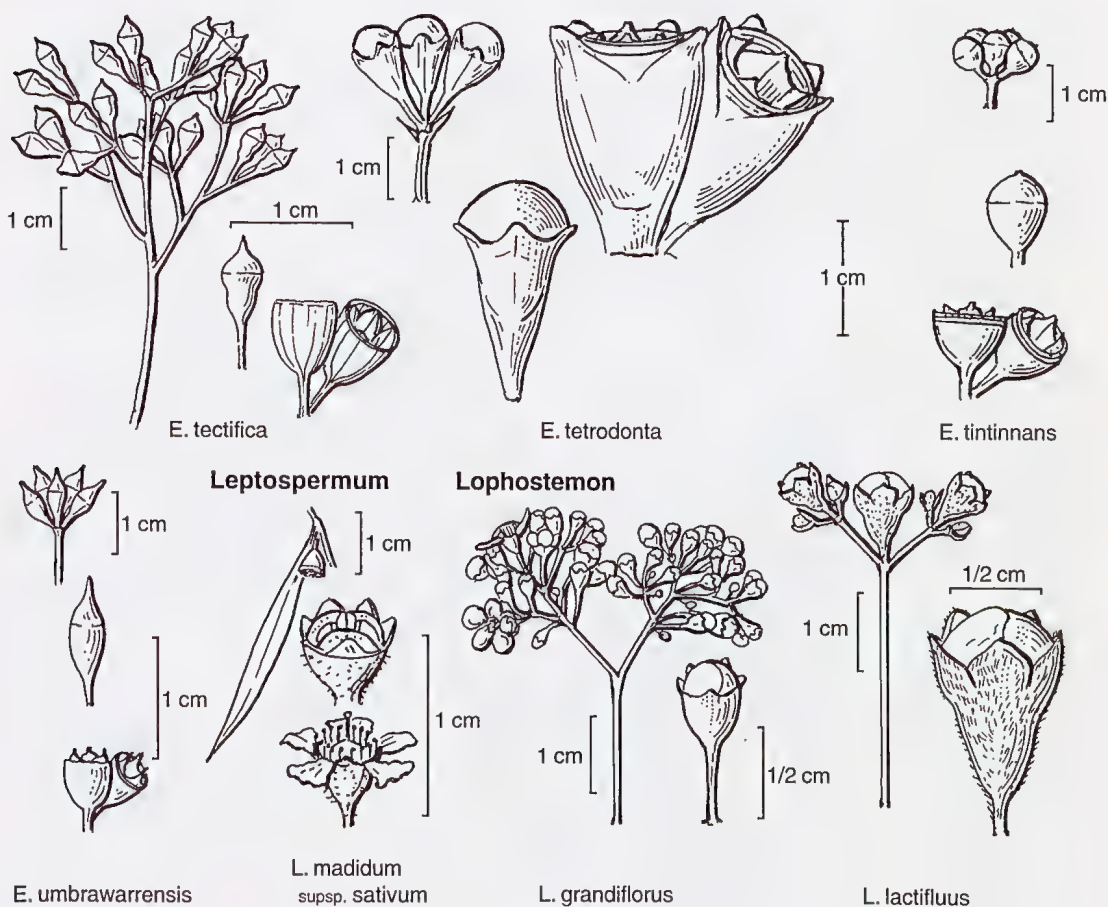


Fig. 53

## MELALEUCA L.

Evergreen trees or shrubs. Leaves opposite or alternate; blades often parallel-nerved. Inflorescence a spike or a head, usually on a vegetative shoot which continues to grow; flowers 1-3 in the axils of bracts. Flowers perigynous; perianth 5-merous. Sepals imbricate, free, persistent. Petals free, deciduous. Stamens in 5 bundles opposite the petals, anthers versatile. Ovary 3-locular, ovules many per locule. Fruit a capsule, enclosed in the enlarged woody hypanthium. Seeds minute. [Blake, 1968; Byrnes, 1984] **Paperbarks**

About 150 species, the majority Australian endemics with a few outside Australia as far north as India; c. 20 species in the NT, 7 in the DR.

*M. leucadendra* and *M. cajuputi* are amongst the tallest and best formed species of trees in the Top End. The latter and perhaps both of these species have been utilised by traditional people for dugout canoes (Specht, 1958; Levitt, 1981). These and other Melaleucas have been cut for sawn timber and round poles. The traditional uses of the papyry bark of many species are manifold. It is used for shelters, containers, for the wrapping of food in cooking, for starting fires and for any activity which requires clean waterproof sheeting. All species have oils in their leaves with *M. cajuputi* the best known source of traditional and commercial medicinal oils. [Specht, 1958; Wightman & Smith 1989; Smith & Wightman 1990]

#### KEY BASED ON VEGETATIVE CHARACTERS

- |    |                                                                       |                       |
|----|-----------------------------------------------------------------------|-----------------------|
| 1. | Inflorescence a globular or ovoid head .....                          | 2                     |
| 1. | Inflorescence a spike .....                                           | 3                     |
| 2. | Fruiting head 10-16 mm wide; stamens 12-15 mm long .....              | <i>Asteromyrtus</i>   |
| 2. | Fruiting head <10 mm wide; stamens 3-8 mm long .....                  | <i>M. acacioides</i>  |
| 3. | New leaves covered with crisped hairs .....                           | <i>M. dealbata</i>    |
| 3. | New leaves covered with predominantly straight hairs .....            | 4                     |
| 4. | Hairs on new leaves mostly spreading .....                            | <i>M. cajuputi</i>    |
| 4. | Hairs on new leaves adpressed .....                                   | 5                     |
| 5. | Leaf blades 5-15 times as long as wide;<br>stamens 7-15 mm long ..... | 6                     |
| 5. | Leaf blades 3-9 times as long as wide;<br>stamens 14-23 mm long ..... | 7                     |
| 6. | Hypanthium and sepals glabrous .....                                  | <i>M. leucadendra</i> |
| 6. | Hypanthium and sepals pubescent .....                                 | <i>M. argentea</i>    |
| 7. | Leaves mostly oblanceolate, 7-31 mm wide .....                        | <i>M. nervosa</i>     |
| 7. | Leaves elliptic or narrowly elliptic, 22-55 mm wide .....             | <i>M. viridiflora</i> |

#### KEY BASED ON FLOWER CHARACTERS

- |    |                                                                                                                              |                       |
|----|------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. | Flowers in a head .....                                                                                                      | <i>M. acacioides</i>  |
| 1. | Flowers in a spike .....                                                                                                     | 2                     |
| 2. | Stamens mostly >15 mm long .....                                                                                             | 3                     |
| 2. | Stamens <15 mm long .....                                                                                                    | 4                     |
| 3. | Stamens 3-6 per bundle; leaves 40-95 mm long .....                                                                           | <i>M. nervosa</i>     |
| 3. | Stamens 6-10 per bundle; leaves (55)95-170 mm long .....                                                                     | <i>M. viridiflora</i> |
| 4. | Hypanthium and sepals glabrous .....                                                                                         | <i>M. leucadendra</i> |
| 4. | Hypanthium and sepals pubescent .....                                                                                        | 5                     |
| 5. | Number of stamens per bundle 4-6; young leaves with crisped hairs .....                                                      | <i>M. dealbata</i>    |
| 5. | Number of stamens per bundle $\geq 6$ ; young leaves with straight hairs .....                                               | 6                     |
| 6. | Inflorescence 20-25 mm wide; spike $\pm$ dense; hairs of young leaves spreading;<br>leaves 3-7 times as long as wide .....   | <i>M. cajuputi</i>    |
| 6. | Inflorescence >25 mm wide; spikes interrupted; hairs of young leaves appressed;<br>leaves 6.5-13 times as long as wide ..... | <i>M. argentea</i>    |

#### *M. acacioides* F.Muell.

Shrub or small tree, 2-5 m high; bark papyry, firm, not flaky. Leaves oblanceolate to narrowly oblanceo-

late, spatulate or narrowly elliptic, apiculate, the young leaves softly pilose soon becoming glabrous, 15-80 mm long, 4-14 mm wide. Inflorescence



of globular or ovoid many flowered axillary, sessile heads on current and older shoots. *Hypanthium* 1.2-1.5 mm long, pilose. *Sepals* triangular, 0.5-0.7 mm long, pilose with narrow scarious margins. *Petals* orbicular, membranous, 1-2 mm long. *Stamens* 5-9 per bundle, 3-8 mm long. Ovary hairy at apex. *Flowering*: May - Sept; fruiting: Aug - Nov. Fig. 54

Distributed from the Kimberley to the Gulf of Carpentaria; in the DR, recorded from the Pt. Stuart area. The species is usually associated with maritime habitats such as salt flats and the landward edge of mangroves where it forms pure stands. In flower it has a distinctive odour which has been likened to the smell of a flying fox camp.

### **M. argentea** W.Fitzg.

Broadly spreading *tree* to 20 m, sometimes taller; bark papery, becoming shaggy. Branchlets pendulous. *Petioles* c. 5 mm long. *Leaf* blades narrowly elliptic, tapering equally to each end from the middle, silvery sericeous, becoming glabrous, 60-130 mm long, 6-22 mm wide. *Inflorescence* of interrupted spikes to 160 mm long. *Hypanthium* c. 2.5 mm long, pubescent. *Sepals* broadly obtuse, pubescent, without a hyaline margin, c. 1.8 mm long. *Petals* orbicular, concave, membranous, often pubescent in the centre of the back, 3-4 mm long. *Stamen* bundles fused at base, falling together, 6-8 per bundle, 10-15 mm long. Ovary pubescent at apex. *Fruit* 2.5-4 mm long, 3-4 mm wide. *Flowering*: July - Oct; fruiting: all year. Fig. 54

Widely distributed throughout tropical Australia. A riverine species, often with *M. leucadendra* from which it is distinguished by its silvery foliage. Cultivated in Darwin where it has proved to be a decorative and hardy street tree.

### **M. cajuputi** Powell

*Tree* to 20 m, rarely to 35 m; bark white, papery. Branchlets and young leaves softly pilose, with spreading hairs, leaves soon glabrous but hairs persistent on petioles and branchlets. *Petioles* c. 5 mm long. *Leaf* blades narrowly elliptic, tapering equally to each end from the middle, often slightly falcate, 24-80(110) mm long, 7-18(28) mm wide, L/B 3-7. *Inflorescence* a spike, 40-140 mm long. *Hypanthium* c. 2 mm long, pubescent. *Sepals* triangular, c. 1 mm long, pubescent, without membranous margin. *Petals* broadly elliptic, concave, membranous, ciliate, c. 2 mm long. *Stamen* bundles separate, 7-11 per bundle, 7-12 mm long. Ovary pubescent at apex. *Fruit* 2-3 mm long, 3-5 mm wide. *Flowering*: Mar - Oct; fruiting: Sept - Dec. Fig. 54

India to northern Australia. Common across the NT and the DR, forming pure stands on the heavy clay soils of the coastal plains. Habitat preference is for sites which remain moist, at least at depth, throughout the year.

### **M. dealbata** S.T.Blake

*Tree* to 12 m, rarely taller; bark white, papery, becoming shaggy. New foliage greyish, densely pubescent with crisped and simple patent hairs; older leaves glabrous. *Petioles* 4-9 mm long. *Leaf* blades elliptic or narrowly elliptic, 42-125 mm long, 12-28 mm wide, L/B 3-7. *Inflorescence* of interrupted spikes 60-110 mm long, densely grey pubescent in all parts except the petals and stamens. *Hypanthium* c. 2 mm long. *Sepals* obtuse, 1-1.2 mm long. *Petals* orbicular, 1.5-2.5 mm long. *Stamens* white, 4-6 per bundle, bundles 6.5-10 mm long, bundles falling separately. *Fruit* 3.5-4 mm long, 3.5-4 mm wide. *Flowering*: Aug - Oct; fruiting: July. Fig. 54

Australian endemic; in the Top End and Qld. Frequently on heavy clay soils which are waterlogged during the Wet; also on sandy soils overlying clay and sometimes in swales of coastal dunes. Distinguished in the field by its blue grey foliage on growing tips. Used in Darwin in street plantings.

### **M. leucadendra** (L.) L.

*Tree* to 30 m; bark white, papery; branchlets pendulous. Young leaves silky hairy, glabrous when fully expanded. *Petioles* 5-15 mm long. *Leaf* blades often falcate, narrowly lanceolate or lanceolate, 55-190 mm long, 7-37 mm wide, L/B 5-15, acute to acuminate. *Inflorescence* of interrupted spikes, 70-130 mm long, glabrous throughout. *Hypanthium* 2-3 mm long. *Sepals* semicircular, overlapping, 1-1.5 mm long. *Petals* orbicular, concave, 2-4 mm long. *Stamens* 5-9 per bundle, bundles 7-14 mm long, falling separately. *Fruit* 2.5-5 mm long, 3-6 mm wide. *Flowering*: Aug - May; fruiting: all year. Fig. 54

Moluccas, New Guinea and northern Australia. In the NT widely distributed over the Top End. In a variety of habitats including freshwater seepages on the landward fringe of mangroves, the margins of freshwater streams and the coastal floodplains in permanent and semipermanent swamps. Cultivated as an amenity tree in Darwin, especially fine leaved forms.

### **M. nervosa** (Lindl.) Cheel

*Tree* to 10 m; rhizomatous, forming patches of

## Melaleuca

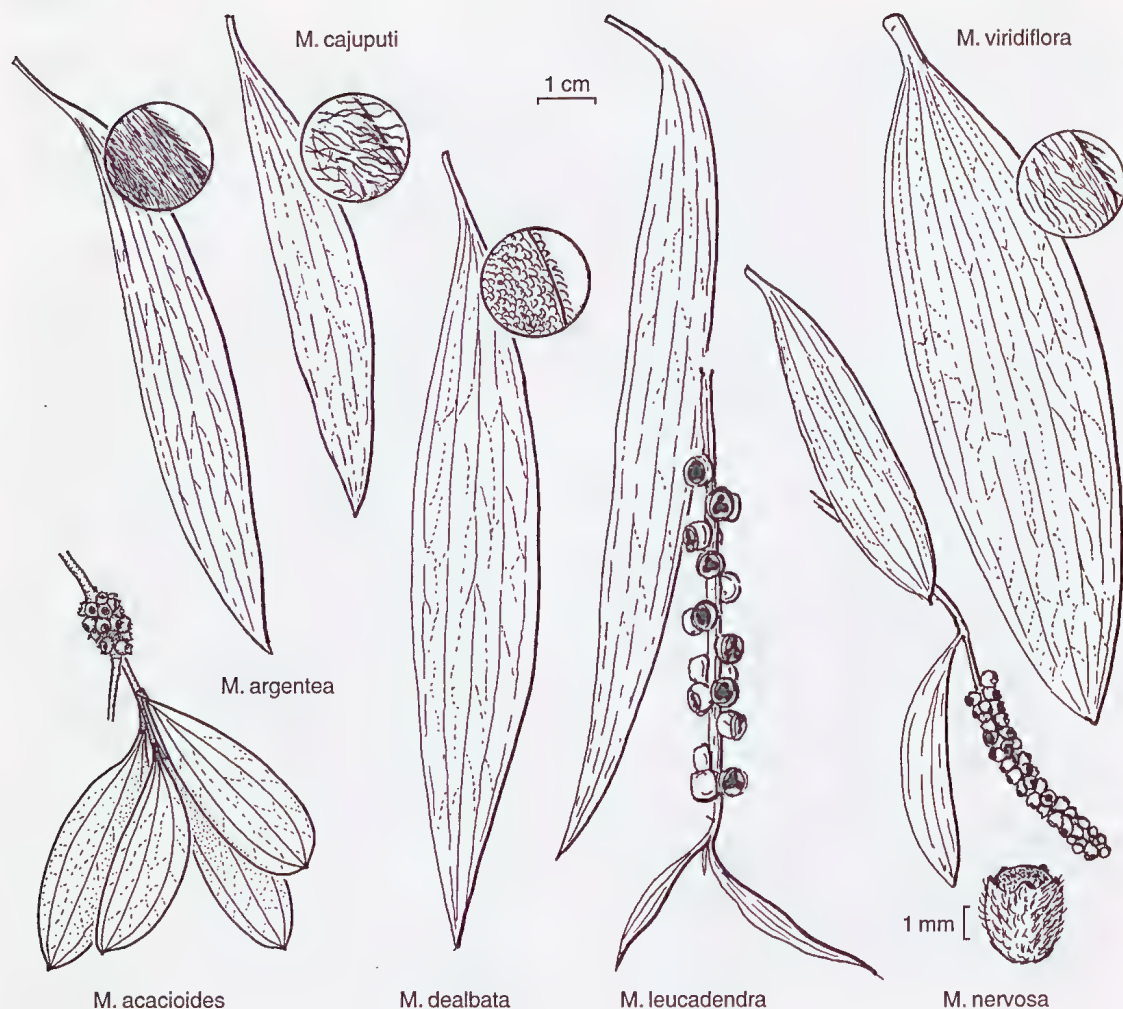


Fig. 54

clonal stems less than 30 cm high; bark often grey or brownish, papery but not flaky. Young leaves sericeous or mealy with short stiff hairs with a few long ones intermixed, soon becoming glabrous. *Petioles* 4-11 mm long. *Leaf* blades stiff, oblanceolate or narrowly elliptic, mucronate, 42-95 mm long, 7-31 mm wide, L/B 3-9. *Inflorescence* a  $\pm$  dense spike, densely pubescent throughout excluding the petals, 22-100 mm long. *Hypanthium* 2.5-2.8 mm long. *Sepals* triangular, hardly differentiated from the hypanthium, c. 1 mm long. *Petals* orbicular or obovate, 2-2.2 mm long. *Stamens* green, cream (also red in Qld), 3-6 per bundle, the filaments often divided almost to the base, bundles 14-23 mm long. *Fruit* 3.5-4 mm long, 3.5-4 mm wide. *Flowering*: May - Sept; *fruiting*: June - Oct. Fig. 54

New Guinea and northern Australia. A common species from Darwin to the Alligator Rivers region

forming pure stands on sandy flats overlying impervious clay or coffee rock.

### *M. viridiflora* Sol. ex Gaertn.

*Tree* 2-16 m; bark white, papery. Young leaves sericeous soon becoming glabrescent and green except in arid habitats where the foliage remains silvery throughout. *Petioles* 8-15 mm long. *Leaf* blades thick, strongly veined, elliptic or narrowly elliptic, (55)95-170 mm long, (7)22-50 mm wide; L/B 2.4-5.7(9); acute. *Inflorescence* a dense spike, 60-70(100) mm long; glabrous throughout or more usually the rachis, hypanthium and sepal bases sericeous. *Hypanthium* 1.5-3 mm long. *Sepals* semicircular, 1-2 mm long with a broad hyaline margin. *Petals* obovate to orbicular, concave, 4-5 mm long with several linear glands between the nerves.

*Stamens* green or greenish white (or red, not in DR), 6-10 per bundle, bundles 15-20 mm long, falling separately. *Fruit* 4-5 mm wide. *Flowering*: Feb - May; fruiting: all year. Fig. 54

New Guinea, tropical Australia and southern Qld. The species has a wide tolerance with respect to habitat and in the NT occurs from the coastal floodplains to creek lines as far inland as the Tanami Desert.

## MYRTELLA F.Muell.

A small genus with 4 named species in Australia and 2 in New Guinea; 1 species in the DR. The Australian species were formerly in the genus *Fenzlia*. [Scott, 1978]

### **M. retusa** (Endl.) A.J.Scott

*Fenzlia retusa* Endl.; *Myrtella phebaloides* W.Fitzg.

Evergreen *shrub*, 1-2(3) m high. New shoots rusty-tomentose. *Leaves* opposite; petioles c. 2 mm long; blades strongly bifacial, oblanceolate, (10)15-35 mm long, 1.5-7 mm wide, L/B 4.3-10, closely white tomentose below, spotted with glands, the glands often ringed by crisped brown hairs, glabrescent or glabrous above. *Inflorescence* of solitary flowers in outer axils; pedicels 5-7 mm long, tomentose. Bracteoles linear,  $\pm$  as long as the hypanthium. *Hypanthium* ovoid, c. 2 mm long, tomentose; perianth 5-merous. *Sepals* narrowly

triangular, c. 2.5 mm long, tomentose, persistent. *Petals* pink, obovate; c. 5 mm long, sparsely hairy outside. *Stamens* many, in 3 series, 3-5 mm long. Ovary 1-locular with several ovules on a parietal placenta. *Fruit* globular or subglobular, crowned by the persistent adpressed calyx, hard, becoming fleshy and purple, indehiscent, 2-seeded, 4-4.5 mm long, glabrescent. *Flowering*: Dec - Apr; fruiting: Feb - July. Fig. 55

Distributed from the Kimberley to Groote Eylandt and possibly in Qld. In the DR known from Melville Is. and the Bynoe Harbour-Darwin R. area on sandy soils.

## OSBORNIA F.Muell.

Monospecific. In Indonesia, New Guinea, the Philippines and northern Australia. [Wightman, 1989]

### **O. octodonta** F.Muell.

Evergreen, densely foliated *shrub* or small *tree* to 6 m; stem fluted in large plants; outer twigs quadrangular. *Leaves* opposite,  $\pm$  sessile; blades obovate or oblanceolate, 31-52 mm long, 14-21 mm wide, glabrous; base attenuate, margin pale, slightly thickened, apex rounded, emarginate. *Inflorescence* terminal, of condensed, usually umbelliform cymes of 3-5 sessile flowers, and axillary of typically solitary sessile flowers. Bracteoles caducous, oblan-

ceolate, c. 3.5 mm long, sericeous. *Flower* buds clavate, c. 7 mm long. *Sepals* 8, persistent, oblong to obovate, c. 2 mm long, sericeous. *Petals* absent. *Stamens* many in continuous ring, c. 3 mm long. Ovary incompletely 2-celled, summit sericeous. Style persistent, sericeous at base. *Fruit* dry, indehiscent. Seeds 1-2. *Flowering*: June - Dec; fruiting: Feb. Fig. 55

In Australia from the Kimberley to northern Qld. Scattered in the DR. A mangrove, usually on the landward margins on sand, mud or rock.

## RHODAMNIA Jack

A genus of c. 25 species distributed from southern China to northern NSW. About 16 species in Australia, mostly from coastal Qld; 1 in the NT and in the DR. [Scott, 1979]



**R. australis** A.J.Scott

Evergreen *trees* or *shrubs* 3-8 m high, often multistemmed; bark grey. Vegetative parts with a closely adpressed white tomentum, upper surface of leaves glabrescent. *Leaves* opposite; petioles 6-11 mm long; blades white below, green above, lanceolate or ovate or broadly elliptic, 48-105 mm long, 23-59 mm wide, L/B 1.3-2.7, intramarginal vein and midrib prominent below, acuminate. *Inflorescence* a few flowered axillary dichasium, c. 10 mm long, sparsely sericeous. Bracteoles c. 1 mm long. *Hypanthium* c. 1.5 mm long; perianth

4-merous. *Sepals* semi-circular, c. 1.5 mm long, ciliate. *Petals* obovate, c. 4 mm long. *Stamens* in a continuous ring in several series, to 3 mm long. Ovary 1-locular. *Fruit* a fleshy berry maturing black, depressed globular, crowned by the persistent calyx; c. 8 mm long. Seeds c. 12, cream, shiny, angular. *Flowering*: Dec - Feb; fruiting: Feb - Mar. Fig. 55

Australian endemic. Chiefly coastal and subcoastal, from Melville Is. to Cape York. In monsoon forests in sandstone gorges and coastal vine thickets. In the DR known from Melville Is.

## SYZYGIUM Gaertn.

Trees or shrubs, evergreen, usually glabrous. Leaves exstipulate, opposite; penniveined, usually with a conspicuous intramarginal vein. Inflorescence terminal or axillary, cymose; bracts caducous. Flowers 4(5)-merous. Calyx and corolla lobes free or in 2 species in the DR,  $\pm$  calyptrate. Stamens cream to white, free, numerous. Ovary 2(3)-locular. Fruit fleshy; calyx lobes usually persistent except when calyptrate, surrounding a shallow apical cavity. Seed usually solitary.

About 500 species, Old World tropics and Australasia. In Australia there are c. 50 species with 8 in the NT, all in the DR. [Hyland, 1983]

*Syzygium* is well known for its edible fruits with species such as Malay Apple (*S. malaccense* (L.) Merr. & F.M.Perry), Water Apple (*S. aqueum* (Burm.f.) Alston) and Jambolan (*S. cumini* (L.) Skeels) cultivated in northern Australia. Many of the native NT species have edible fruits with the most palatable being *S. suborbiculare* (q.v.) and *S. eucalyptoides* subsp. *bleeseri* (Specht, 1958; Levitt, 1981). The nutritional composition of several species is provided by Miller et al.(1993). Medicinal properties are reported for the leaves, bark, fruit and seed of *S. suborbiculare* (Levitt, 1981; Scarlett et al. 1982; Abor. Comm. NT, 1993). A number of species are important timber trees in Qld. Although many of the NT species would provide useful timber, stands are too small and too scattered. Formation of bark in the wood of *S. suborbiculare* and *S. eucalyptoides* makes these species useless for sawn timber (Hyland, 1983). Australian and Asian species of *Syzygium* were formerly under *Eugenia*.

### KEY BASED ON FRUIT CHARACTERS

- |    |                                                          |                         |
|----|----------------------------------------------------------|-------------------------|
| 1. | Fruit white .....                                        | 2                       |
| 1. | Fruit variously coloured, not pure white .....           | 4                       |
| 2. | Fruit c. 25 mm long .....                                | <b>S. forte</b>         |
| 2. | Fruit <25 mm long .....                                  | 3                       |
| 3. | Fruit depressed globular, surface rugose .....           | <b>S. armstrongii</b>   |
| 3. | Fruit $\pm$ cylindrical or obovoid, smooth .....         | <b>S. minutiflorum</b>  |
| 4. | Fruit >30 mm long .....                                  | <b>S. suborbiculare</b> |
| 4. | Fruit <30 mm long .....                                  | 5                       |
| 5. | Fruit purple to black or white with a purple blush ..... | 6                       |
| 5. | Fruit red, bright pink or white with a red blush .....   | 7                       |
| 6. | Fruit without persistent sepals .....                    | <b>S. nervosum</b>      |
| 6. | Fruit with persistent sepals .....                       | <b>S. angophoroides</b> |

- |    |                                                       |                         |
|----|-------------------------------------------------------|-------------------------|
| 7. | Fruit bright pink with narrow triangular sepals ..... | <b>S. fibrosum</b>      |
| 7. | Fruit red or white with a red blush .....             | <b>S. eucalyptoides</b> |

### KEY BASED ON FLOWER CHARACTERS

- |    |                                                                                |                         |
|----|--------------------------------------------------------------------------------|-------------------------|
| 1. | New growth 4-angled; flowers 5-merous .....                                    | <b>S. angophoroides</b> |
| 1. | New growth $\pm$ terete; flowers 4-merous .....                                | <b>2</b>                |
| 2. | Buds >27 mm long; calyx lobes >6.5 mm long .....                               | <b>S. suborbiculare</b> |
| 2. | Buds <20 mm long; calyx lobes <6.5 mm long or calyx calyptate .....            | <b>3</b>                |
| 3. | Petals or sepals calyptate .....                                               | <b>4</b>                |
| 3. | Petals and sepals free .....                                                   | <b>5</b>                |
| 4. | Stamens c. 1 mm long; leaves oblanceolate or elliptic, scarcely aromatic ..... | <b>S. minutiflorum</b>  |
| 4. | Stamens c. 4 mm long; leaves elliptic, aromatic .....                          | <b>S. nervosum</b>      |
| 5. | Stamens c. 15 mm long; sepals narrowly triangular .....                        | <b>S. fibrosum</b>      |
| 5. | Stamens <15 mm long; sepals semi-circular .....                                | <b>6</b>                |
| 6. | Buds >9 mm long; sepals >2 mm long .....                                       | <b>S. eucalyptoides</b> |
| 6. | Buds <9 mm long; sepals <2 mm long .....                                       | <b>7</b>                |
| 7. | Stamens 4-7 mm long; leaves 19-36 mm wide .....                                | <b>S. armstrongii</b>   |
| 7. | Stamens 10-12 mm long; leaves 32-80 mm wide .....                              | <b>S. forte</b>         |

### **S. angophoroides** (F.Muell.) B.Hyland

*Eugenia angophoroides* F.Muell.

*Tree* to 20 m; bark reddish and papery on mesic sites, usually grey, hard and fissured on drier and more exposed sites; current seasons branchlets strongly 4-angled. *Petioles* 3-9 mm long, grooved above. *Leaf* blades elliptic, 60-120 mm long, 20-45 mm wide, lateral veins evident,  $\pm$  30 pairs, intramarginal vein evident; midrib grooved above, raised below; base obtuse to cuneate; acuminate. *Inflorescence* in upper axils and terminating current seasons shoots; to 85 mm long; bracts deciduous. *Flowers* 5-merous; buds  $\pm$  sessile, articulate on short peduncles, obovoid, c. 5.5 mm long. *Hypanthium* c. 3.5 mm long, 3 mm wide. *Calyx* lobes broadly triangular, c. 0.5 mm long, obtuse. *Petals* cream, orbicular, c. 2.5 mm long. *Stamens* c. 5 mm long. *Fruit* dark purple or white with purplish blush,  $\pm$  globular with persistent calyx lobes, c. 8 mm long. *Flowering*: July - Dec; fruiting: Nov - Feb. Fig. 55

Endemic to northern Australia; from the Kimberley to Qld. In the DR recorded from Melville Is. to Litchfield NP area; in perennially wet rainforest.

### **S. armstrongii** (Benth.) B.Hyland

*Eugenia armstrongii* Benth.

*Tree* to 12 m, rarely to 25 m; bark pale grey, smooth.

*Petioles* 5-10 mm long. *Leaf* blades slightly discolorous, elliptic or narrowly elliptic, 75-135 mm long, 19-36 mm wide, base attenuate, apex acute to acuminate. *Inflorescence* many-flowered, terminal, to 120 mm long. *Flowers* 4-merous; pedicels c. 4 mm long; buds pyriform, 7-8 mm long. *Hypanthium* c. 3 mm long, 3 mm wide. *Sepals* broadly triangular, c. 1.5 mm long. *Petals*  $\pm$  orbicular, c. 4 mm long. *Stamens* 4-7 mm long. *Fruit* white, depressed globular, the surface rugose, to c. 15 mm long. *Flowering*: Sept - Nov; fruiting: Jan. Fig. 55

Endemic to the Top End, from Darwin to western Arnhem Land. Common in the DR on stream margins. The fruit float and are so dispersed by the stream during the Wet season.

### **S. eucalyptoides** (F.Muell.) B.Hyland

*Eugenia eucalyptoides* F.Muell.

*Tree* or multi-stemmed shrub; bark smooth, pale grey. *Petioles* 5-12 mm long. *Leaf* blades  $\pm$  glaucous, orbicular, elliptic, lanceolate or obovate, 40-185 mm long, 8-95(165) mm wide. *Inflorescence* terminal, cymose. *Flowers* 4-merous, pedicellate, buds campanulate, 9-13 mm long. *Sepals* semi-circular. *Petals* orbicular, clawed, to 13 mm long. *Stamens* to 12 mm long. *Fruit* white to red, globular with persistent calyx, to 30 mm long.

Two subspecies are recognised:

1. Sepals 2-4 mm long; leaves 8-24 mm wide, narrowly elliptic or narrowly obovate ..... subsp. **eucalyptoides**
1. Sepals 4-5 mm long; leaves 35-165 mm wide, orbicular to lanceolate ..... subsp. **bleeseri**

**S. eucalyptoides** subsp. **bleeseri** (O.Schwarz) B.Hyland  
*Eugenia bleeseri* O.Schwarz

*Tree* to 10 m, commonly occurring as stunted clonal suckers flowering and fruiting less than 1 m high. *Leaf* blades subglaucous, concolorous, orbicular to lanceolate, 40-130(150) mm long, 35-95(165) mm wide, base truncate to attenuate. Pedicels c. 2 mm long; buds 12-13 mm long. *Hypanthium* 5.5-7 mm long, 6.5-8 mm wide. *Sepals* 4-5.5 mm long. *Fruit* usually white with a pink blush. *Flowering*: July - Oct; fruiting: Nov - Dec. Fig. 55

**White Bush Apple**

Australian endemic occurring from the Kimberley to Cobourg Peninsula; common and widespread in the DR. Usually on sandy soils.

**S. eucalyptoides** subsp. **eucalyptoides**

*Tree* or multi-stemmed *shrub*, rarely above 6 m high. *Leaf* blades glaucous, isobilateral, straight or falcate, narrowly elliptic or narrowly obovate, 70-185 mm long, 8-24 mm wide. *Inflorescence* often contracted and few flowered. Pedicels 2-4 mm long; buds 9-12 mm long. *Hypanthium* 4-8 mm long, 3.5-8.8 mm wide. *Sepals* 2-4 mm long. *Fruit* red, pink or white with a pink blush. *Flowering*: June - Nov; fruiting: Dec - Jan. Fig. 55

Endemic to northern Australia; from the Kimberley to Cape York. On streams and in seasonal stream beds in sandstone or quartzite; occasionally in open vegetation on sandy soils. Specimens with features intermediate between the two subspecies are frequent.

**S. fibrosum** (F.M.Bailey) T.G.Hartley & L.M.Perry  
*Eugenia fibrosa* F.M.Bailey

*Shrub* or small *tree* to 15 m but usually smaller; bark smooth, pale brown. *Petioles* 5-12 mm long. *Leaf* blades elliptic to broadly elliptic, rarely obovate, 70-100 mm long, 26-55 mm wide; base attenuate, apex acuminate. *Inflorescence* terminal and axillary, 30-90 mm long. *Flowers* 4-merous; buds  $\pm$  sessile, clavate, c. 7 mm long. *Hypanthium* 4.5-6 mm long, 2-3 mm wide. *Sepals* narrowly triangular, rigid, c. 4 mm long. *Petals* spatulate, c. 4 mm long. *Stamens* c. 15 mm long. *Fruit* bright pink, globular, the persistent sepals conspicuous, 10-25 mm long. *Flowering*: Mar - May; fruiting: July - Oct. Fig. 55

Old and New Guinea; in the NT in Arnhem Land and on Melville Is. An understorey species growing in dense shade in rainforest.

**S. forte** (F.Muell.) B.Hyland  
*Eugenia fortis* F.Muell.

*Tree* to 25 m; bark usually flaky to papery, pinkish. *Petioles* 5-12 mm long. *Leaf* blades discolorous, subglaucous, oblanceolate, obovate or narrowly to broadly elliptic, 80-140 mm long, 32-72(80) mm wide, base attenuate, apex obtuse. *Inflorescence* terminal, 75-110 mm long. *Flowers* 4-merous; buds  $\pm$  sessile, turbinate, 6-9 mm long. *Hypanthium* 5.5-7.5 mm long, 5.5-8 mm wide. *Sepals* semicircular to subtriangular, c. 2 mm long. *Petals* orbicular, c. 5 mm long. *Stamens* 10-12 mm long. *Fruit* white, depressed globular, c. 25 mm long. *Flowering*: Sept - Dec; fruiting: Jan. Fig. 55

Tropical Australia and New Guinea. A common species of riverine vegetation as far south as Katherine. In the DR found in rainforest on Melville Is. and on the Daly R. Two subspecies are recognised by Hyland. 1. subsp. **forte**: inflorescence terminating leafy twigs in the upper axils; leaves usually orbicular, obovate, rarely lanceolate. 2. subsp. **potamophilum**: inflorescence terminal below the leaves or inside the crown; leaves narrowly ovate, elliptic or lanceolate.

**S. minutuliflorum** (F.Muell.) B.Hyland  
*Eugenia minutuliflora* F.Muell.

*Tree* to 20 m high, shortly buttressed; bark brown or grey, shedding in stiff flakes. *Petioles* c. 7 mm long, grooved above. *Leaf* blades slightly glaucous, drying grey-green, obovate, oblanceolate or elliptic, 75-135 mm long, 30-58 mm wide; midrib grooved above, raised below, secondary venation obscure. *Inflorescence* in upper axils and terminating current seasons shoots, bracts deciduous. *Flowers* 4-merous; buds  $\pm$  sessile, obovoid, articulate on short peduncle, c. 3 mm long. *Hypanthium* c. 3 mm long, 2.5 mm wide. *Calyx* lobes c. 0.2 mm long. *Petals* cohering, falling as a calyptra. *Stamens* c. 1 mm long. *Fruit* white, obovoid, globular or  $\pm$  cylindrical, 10-21 mm long, the apex truncate with a circular cavity around the style base. *Flowering*: Sept - Nov; fruiting: Oct - Jan. Fig. 55



Endemic to the Top End; from Melville Is. to Gove Peninsula. Reasonably common in the DR. In rainforests on perennial streams associated with sandstone; rarely on clay soils.

**S. nervosum** DC.

*Cleistocalyx operculatus* (Roxb.) Merr. & L.M.Perry  
*Syzygium operculatum* (Roxb.) Niedenzu

*Tree* to 25 m high; buttressed; bark grey to brown, smooth, shedding in rounded plates. *Petioles* reddish in fresh state, drying dark brown, cylindrical, 8-17 mm long. *Leaf* blades elliptic, 90-190 mm long, 38-62 mm wide; base obtuse, margin often undulate, acuminate. *Inflorescence* on previous seasons (woody) twigs; to 70 mm long, secondary branches at  $\pm$  right angles to primary branch; bracts deciduous. *Flowers* 4-merous; buds sessile, articulate on short peduncles, turbinate, c. 4.5 mm long. *Hypanthium* c. 3 mm long, 3-4.5 mm wide. *Calyx* and corolla shed at anthesis as a mucronate calyptra. *Stamens* c. 4 mm long. *Fruit* purple,  $\pm$  globular, c. 10 mm diam. *Flowering*: Aug - Nov; fruiting: Dec - Feb. Fig. 55

Widespread from India to northern Australia; in Australia from the Kimberley to Groote Eylandt. In permanently wet rainforests on clayey soils; for example, Holmes Jungle and other spring jungles on the margins of the coastal plains.

**S. suborbiculare** (Benth.) T.G.Hartley & L.M.Perry  
*Eugenia suborbicularis* Benth.

*Tree* to 14 m, usually less than 10 m; rhizomatous, occasionally forming clonal patches and flowering less than 1 m high; bark grey and smooth. *Petioles* reddish in fresh state, 13-25 mm long. *Leaf* blades dark green, shiny above, discolorous, broadly elliptic to orbicular, 95-175 mm long, 75-120 mm wide. *Inflorescence* terminal, often reduced and few flowered. *Flowers* 4-merous; pedicels c. 6 mm long; buds pyriform, 27-30 mm long. *Hypanthium* 13-18 mm long, 12-17 mm wide. *Sepals* semi-circular, 6.5-10 mm long. *Petals* orbicular, c. 20 mm long. *Stamens* 13-48 mm long. *Fruit* red,  $\pm$  globular, ribbed, 30-70 mm long. *Flowering*: July - Oct; fruiting: Nov - Dec. Fig. 55

**Red Bush Apple**

Tropical Australia and New Guinea. Widespread and common through the savanna; prominent on the margins of the coastal floodplains in sandy soils. This species is not always readily separated from *S. eucalyptoides* subsp. *bleeseri* in dried specimens. Populations from coastal dunes on Melville Is. and similar habitats across the north coast differ from the normal form in having dull leaves and smooth white fruit with a pink blush. They are reputedly of better eating quality than the common form.

**VERTICORDIA** DC.

Evergreen shrubs. Leaves sessile, decussate or whorled, linear. Inflorescence of solitary axillary flowers clustered at the ends of the branchlets. Pedicels expanded at the apex forming a concave receptacle edged with a whorl of short, rigid, russet hairs. Bracteoles brownish, enveloping the buds, deciduous, semicircular, concave with a prominent subapical mucro. Buds globular. Hypanthium strongly glandular punctate, indistinctly ribbed. Perianth 5-merous. Sepals free, white, deeply and finely lacinate. Petals fused at the base to form a tube; lobes white. Stamens 10, alternating with 10 staminodes, inserted at the base of the corolla lobes, fused for 1/2 their length into a tube. Stigma subtended by a ring of long hairs. Fruit dry, indehiscent, similar in size and shape to the flower. Seed solitary.

Australian endemic genus of c. 54 species concentrated in south western WA; 3 in the NT, 2 in the DR. All NT species are included in this Flora. [Byrnes, 1977b]

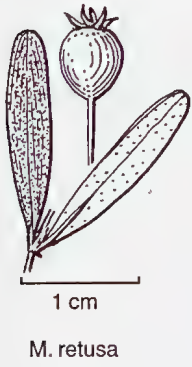
- |                                                  |                        |
|--------------------------------------------------|------------------------|
| 1. Leaves <3 mm long .....                       | <b>V. decussata</b>    |
| 1. Leaves >10 mm long .....                      | <b>2</b>               |
| 2. Leaves verticillate; style 8-10 mm long ..... | <b>V. verticillata</b> |
| 2. Leaves decussate; style 6-7 mm long .....     | <b>V. cunninghamii</b> |

**V. cunninghamii** Schauer

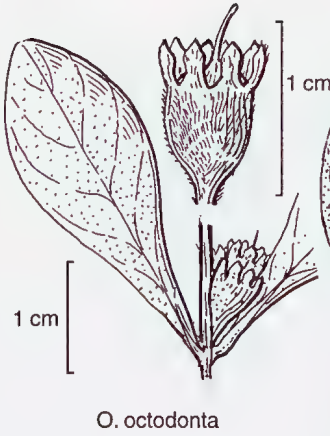
*Shrub* to 4 m, glabrous. *Leaves* decussate, ascending, adaxial surface grooved,  $\pm$  semicircular in cross section, 10-15 mm long, c. 0.5 mm wide. *Pedicels* c.

7 mm long. *Bracteoles* c. 4 mm long. *Buds* c. 4 mm long. *Hypanthium* 2-2.5 mm long, c. 2.5 mm wide. *Sepals* c. 5 mm long. *Petaline* tube c. 1.5 mm long; lobes elliptic, 3-3.5 mm long, margins irregularly

**Myrtella**



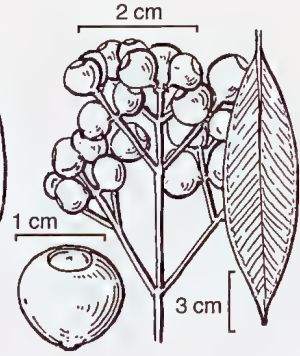
**Osbornia**



**Rhodamnia**



**Syzygium**



**Syzygium**

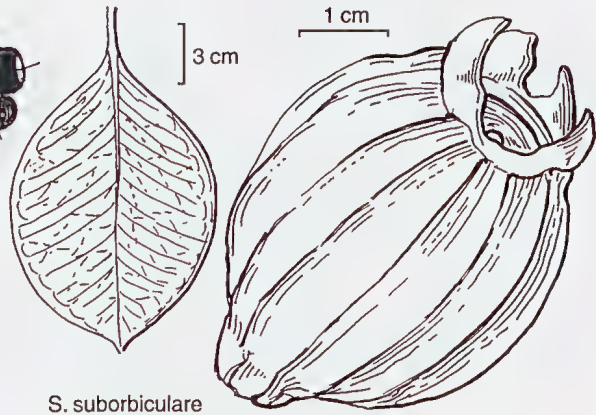
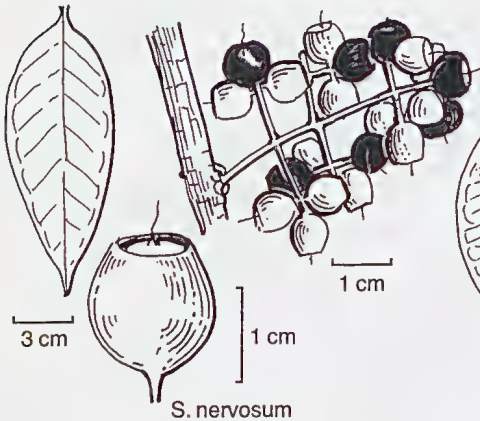
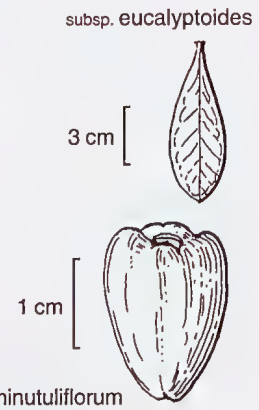
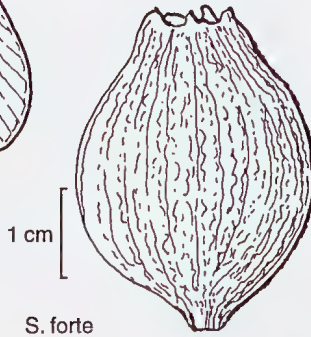
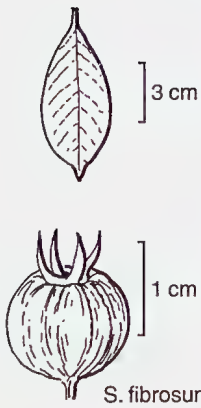
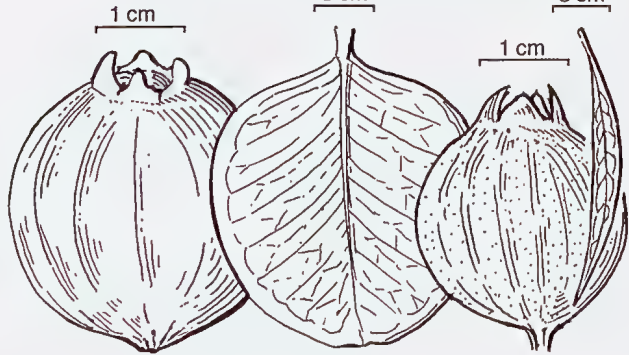
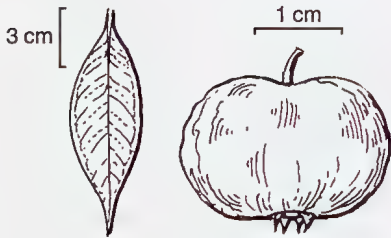


Fig. 55

toothed, apex deeply  $\pm$  bifid. *Stamens* c. 2.5 mm long. *Style* c. 6 mm long. *Flowering* and fruiting: June - Oct. Fig. 56

From the Kimberley to the eastern NT border on seasonally flooded, sandy sites.

#### V. *decussata* S.T.Blake ex Byrnes

*Shrub* to 5 m. *Leaves* decussate, closely imbricate on short axillary shoots, ascending, semicircular in cross section, the adaxial surface grooved, 1.5-2.5 mm long, c. 0.5 mm wide. *Pedicels* c. 1 mm long. *Bracteoles* c. 2.5 mm long. *Buds* c. 2.5 mm long. *Hypanthium* c. 2 mm long, 3 mm wide. *Sepals* c. 4 mm long. *Petaline* tube c. 0.3 mm long; lobes ovate, 2-2.5 mm long, margin and apex irregularly toothed. *Staminal* tube c. 0.75 mm long; staminodes glandular-bullate. *Style* c. 3.5 mm long. *Flowering*: July - Nov; fruiting: Nov - Dec. Fig. 56

An NT endemic from the Arnhem Land plateau;

not yet recorded from the DR but found nearby on sandstone at Edith R.

#### V. *verticillata* Byrnes

*Shrub* to 6 m. *Leaves* whorled, 4 per whorl, curved, triquetrous with midrib raised on the adaxial surface, 11-30 mm long, c. 0.5 mm wide. *Pedicels* 10-13 mm long. *Buds* 4.5-5 mm long. *Bracteoles* c. 4 mm long. *Hypanthium* 1.5-2 mm long, 2-2.5 mm wide. *Sepals* 5-7 mm long. *Petaline* tube c. 1 mm long; lobes ovate, 3-4 mm long, margin irregularly toothed, apex entire, acute. *Stamens* (including tube) c. 4 mm long. *Style* 8-10 mm long. *Flowering*: July - Nov; fruiting: Dec - Jan. Fig. 56

Distribution as for *V. cunninghamii*. Similar in appearance to that species; both occur on sandy soils though *V. verticillata* is usually on more elevated sites which are not seasonally flooded. Preferred habitat includes stabilised coastal dunes.

### XANTHOSTEMON F.Muell.

Evergreen trees, rarely shrubby. *Leaves* decussate or alternate, usually congested terminally. *Inflorescence* a simple or compound pleiochasium. *Flowers* 4-5-merous. *Hypanthium* broadly campanulate and shallow. *Sepals* free, persistent. *Petals* clawed. *Stamens* numerous, free or slightly fused at the base, in 1 or 2 whorls on the hypanthium rim; anther dehiscence longitudinal. *Ovary* half inferior, 3-5-locular. *Style*  $\pm$  equal to stamen length. *Capsule* woody.

50 species in Australia, Malaysia, New Caledonia; 14 in tropical Australia, 4 in the NT, 3 in the DR. All NT species are treated here. [Dawson, 1972; Wilson, 1990]

- |    |                                                                                                            |                         |
|----|------------------------------------------------------------------------------------------------------------|-------------------------|
| 1. | Branchlets quadrangular; leaves decussate .....                                                            | 2                       |
| 1. | Branchlets rounded; leaves alternate .....                                                                 | 3                       |
| 2. | Leaf base obtuse to cordate; petioles to 2 mm long .....                                                   | X. <i>eucalyptoides</i> |
| 2. | Leaf base attenuate; petioles 2-10 mm long .....                                                           | X. <i>umbrosus</i>      |
| 3. | Petals and stamens yellow; stamens 20-27 mm long;<br>fruit globose, 7-13 mm diam., glabrous .....          | X. <i>paradoxus</i>     |
| 3. | Petals and stamens cream; stamens c. 7 mm long;<br>fruit depressed globular, 5-6 mm diam., pubescent ..... | X. <i>psidioides</i>    |

#### X. *eucalyptoides* F.Muell.

*Metrosideros eucalyptoides* (F.Muell.) F.Muell.

*Tree* 5-18 m; bark grey, flaky. *Branchlets* quadrangular, puberulous. *Leaves* decussate; petioles c. 2 mm long; blades discolorous, elliptic, 65-132 mm long, 32-68 mm wide, puberulous or glabrescent, base obtuse to cordate, apex obtuse or emarginate. *Inflorescence* cymose, often several in the upper axils forming a terminal cluster of 5-30 flowers, to 40 mm long; bracts filiform, persistent; all parts

puberulous. *Pedicels* 4-7 mm long. *Hypanthium* c. 2 mm long, 3.5-4.5 mm wide. *Calyx* lobes arising with the stamens from the staminal disc, 4 or 5, linear to spatulate, 1.5-2 mm long. *Corolla* absent. *Stamens* white, well spaced in 2 whorls, 7-8 mm long. *Fruit* globose, 4-7 mm long, glabrous. *Flowering*: Apr - Oct; fruiting: Aug - May. Fig. 57

Relatively common, from Arnhem Land to the Kimberley; in the DR in Litchfield NP. On perennial streams, especially those associated with sandstone.



## Verticordia

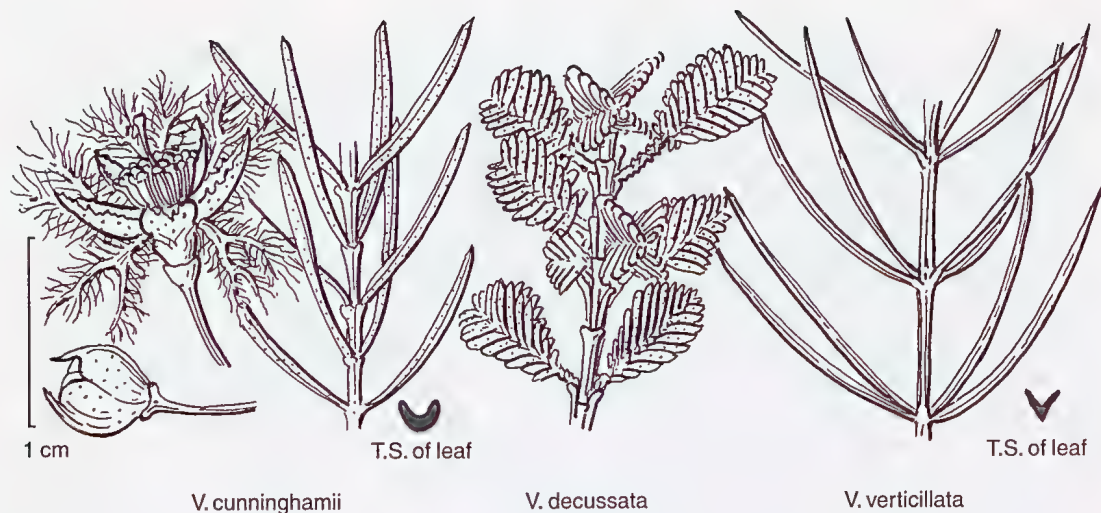


Fig. 56

### X. paradoxus F.Muell.

*Tree* 4-12 m; bark grey, rough, flaky. *Leaves* alternate; petioles 4-20 mm long; blades discolorous, glabrous throughout or only above to densely puberulous throughout, narrowly to broadly elliptic, 50-140 mm long, 26-75 mm wide, base obtuse to attenuate, apex obtuse. *Inflorescence* cymose, in upper axils, all parts glabrous to puberulous, 25-70 mm long, bracts caducous. Pedicels 6-10 mm long. *Hypanthium* c. 3 mm long, 4-7 mm wide. *Calyx* lobes triangular, 1.6-3.5 mm long, acute, margins ciliate even in glabrous forms. *Petals* yellow, the blades ovate to orbicular, 4-5 mm long, ciliate. *Stamens* yellow, in 1 whorl, free or slightly fused at the base, arising from the margin of a slightly exerted disc, 20-27 mm long. *Fruit* globose, 7-13 mm long, glabrous. *Flowering* and *fruiting*: irregular. Fig. 57

Common and widespread across northern Australia. In the DR found in a variety of habitats from moist sites to rocky ridges. Variation in leaves and fruit is discussed by Wilson (1990). The species has a hard, dense timber.

### X. psidioides (A.Cunn. ex Lindl.) Peter Wilson & J.T.Waterh.

*Tristania psidioides* A.Cunn. ex Lindl.

*Tree*, rarely a *shrub*, to 5 m; bark dark grey to almost black, platy or tessellated. *Leaves* alternate; petioles 9-16 mm long; blades strongly discolorous, mostly elliptic, 50-150 mm long, 20-65 mm wide, finely velvety pubescent below, glabrous above, base attenuate, apex acute to obtuse. *Inflorescence* corymbose, 20-75 mm long, all parts excluding upper surface of petals and stamens, puberulous.

## Xanthostemon

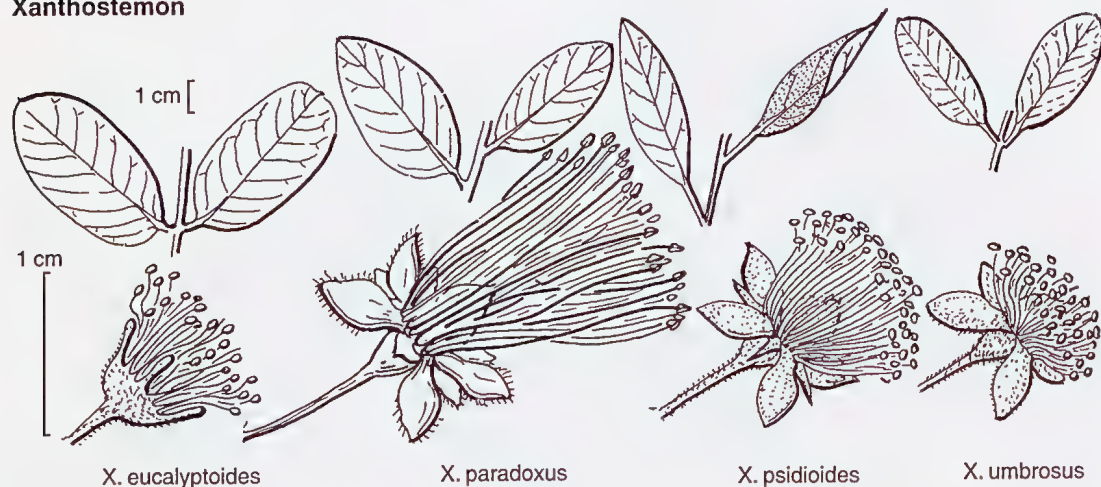


Fig. 57

Pedicels 4-6 mm long. *Flowers* 5-merous. *Hypanthium* c. 2.5 mm long, 4.5 mm wide. *Calyx* lobes narrowly triangular, 2-3 mm long. *Petals* cream, the blades orbicular to elliptic, 2.5-4 mm long. *Stamens* cream, in a single whorl, free, c. 7 mm long. *Fruit* depressed globular, 5-6 mm diam., puberulous. *Flowering*: Feb - June; fruiting: most months. Fig. 57

In disjunct populations from Arnhem Land to the Kimberley. In the DR known only from Melville Is. where it is found on weathered sandstone and laterite. In the Alligator Rivers region it forms stands in sandstone gorges.

**X. umbrosus** (A.Cunn. ex Lindl.) Peter Wilson & J.T.Waterh.

*Tristania umbrosa* A.Cunn. ex Lindl.

*Metrosideros tetrapetala* F.Muell.

*Tree*, often multistemmed or shrubby, to 14 m

high; bark smooth, mottled grey and cream. Branchlets quadrangular, pubescent. *Leaves* decussate; petioles 2-10 mm long, finely pubescent; blades discolorous, elliptic, 45-85 mm long, 25-40 mm wide, pubescent to glabrescent below, glabrous to glabrescent above, base attenuate, apex obtuse. *Inflorescence* corymbose, puberulous throughout. *Flowers* 4-merous; pedicels 6-10 mm long. *Hypanthium* c. 1.5 mm long, 3-4 mm wide. *Sepals* triangular, 2.5-3 mm long. *Petals* cream, blades  $\pm$  orbicular, 3-3.5 mm long, pubescent below, glabrous above. *Stamens* cream, in 2 whorls, free, 4-5 mm long. *Fruit* globose or  $\pm$  depressed globose, 7-9 mm diam., glabrous. *Flowering*: Mar; fruiting: Mar - July. Fig. 57

Distributed from the Kimberley to Qld. In the NT in the Alligator Rivers region and Groote Eylandt; not recorded in the DR. In monsoon thickets, usually on sandstone.

## RHIZOPHORACEAE

G.M. Wightman

Trees or shrubs, evergreen, viviparous (except *Carallia*), stilt roots and variously shaped pneumatophores often present. Stipules interpetiolar, deciduous. Leaves decussate, simple, petiolate, coriaceous, entire or serrulate, glabrous. Inflorescence cymose or flowers solitary, usually axillary. Flowers usually subtended by bracteoles, bisexual, actinomorphic, 4-5(16)-merous, perianth and stamens hypogynous or epigynous arising from hypanthium. Calyx persistent, valvate. Corolla often caducous. Stamens usually twice as many as corolla lobes, often in pairs opposite the petals; anthers 4-multi-locular. Ovary 2-8-locular; ovules 2 per locule, pendulous; style simple; stigma simple or variously lobed. Fruit fleshy or leathery, indehiscent. Seed 1. Hypocotyl elongate.

A family of about 16 genera and 120 species of tropical distribution. Four genera in the NT, all in the DR; all are mangroves except *Carallia*. [Ding Hou, 1958; McCusker, 1984; Wightman, 1989]

- |                                                                                                      |                   |
|------------------------------------------------------------------------------------------------------|-------------------|
| 1. Trees of non-maritime habitats; not viviparous; petals clawed .....                               | <b>Carallia</b>   |
| 1. Trees or shrubs of mangrove habitats; viviparous; petals not clawed .....                         | <b>2</b>          |
| 2. Trees supported by stilt roots; calyx 4-lobed; petals entire .....                                | <b>Rhizophora</b> |
| 2. Trees and shrubs without stilt roots; calyx 5-16-lobed; petals lobed .....                        | <b>3</b>          |
| 3. Trees; knee roots often present; calyx 8-16-lobed; petals bifid or emarginate .....               | <b>Bruguiera</b>  |
| 3. Shrubs or small trees; knee roots never present; calyx 5-6-lobed; petals fringed or 3-lobed ..... | <b>Ceriops</b>    |

## BRUGUIERA Lam.

Large shrubs or trees; base often buttressed, pneumatophores knee-like. Leaves black-dotted beneath. Inflorescence 1-10-flowered; bracteoles absent. Sepals and petals 8-16; petals each embracing 2 stamens,

2-lobed, variously tomentose. Stamens epipetalous; filaments filiform; anthers linear to oblong. Ovary inferior, 2-4-locular; style filiform; stigma obscurely lobed. Hypocotyl terete or slightly ridged, blunt, falling with fruit.

Six species distributed from tropical Africa and Asia and Polynesia. Four species occur in the NT, 3 in the DR.

- |                                                                                        |                       |
|----------------------------------------------------------------------------------------|-----------------------|
| 1. Inflorescence 2-10-flowered; bristle in sinus of petal lobes exceeding lobes .....  | <b>B. parviflora</b>  |
| 1. Inflorescence 1-flowered; bristle in sinus of petal lobes not exceeding lobes ..... | <b>2</b>              |
| 2. Pedicel red; hypanthium reddish, indistinctly ribbed .....                          | <b>B. gymnorrhiza</b> |
| 2. Pedicel green; hypanthium green, distinctly ribbed .....                            | <b>B. exaristata</b>  |

### **B. exaristata** Ding Hou

*Tree* to 8 m, bark dark grey, tessellated; stem base flanged; pneumatophores numerous. *Stipules* lanceolate, 21-35 mm long. Petioles 18-26 mm long. *Leaf blades* obovate, 55-115 mm long, 24-45 mm wide, margins often involute. *Flowers* pendulous, 22-27 mm long; pedicel 6-12 mm; hypanthium ridged. *Sepals* 8-9(10), linear-lanceolate, 12-16 mm long. *Petals* 8-9(10), 10-13 mm long, caducous, bilobed, lobes c. 5 mm long, margins and base villous, bristle of sinus absent or minute. *Staminal* filaments 8-9 mm long; anthers apiculate, c. 5 mm long. *Style* c. 14 mm long; stigma shortly 3-lobed. *Fruit* turbinate, 13-16 mm long. *Hypocotyl* cylindrical, slightly ridged, 50-72 mm long, apex blunt. *Flowering* and fruiting: all months. Fig. 58

Widespread and common across the NT coast; also WA, Qld, Timor and New Guinea. Occupies mid zones of mangrove communities on a variety of soil types.

### **B. gymnorrhiza** (L.) Savigny

Columnar *tree* to 15 m; bark dark grey to brown, tessellate to smooth, lenticular; stem base buttressed; pneumatophores numerous. *Stipules* 3.5-4.5 mm long, reddish. Petioles 28-50 mm long. *Leaf blades* elliptic to elliptic-lanceolate, 45-71 mm long, 95-185 mm wide. *Flowers* pendulous, 32-39 mm long; pedicel red, c. 10 mm long; hypanthium reddish, terete or slightly ridged. *Sepals* pink to red, 10-14(16), linear, 15-21 mm long, acute. *Petals* 13-16 mm long, lobes 5-6 mm long with 2-3 bristles c. 3 mm long on apex, 1 conspicuous bristle in sinus, margins and base villous. *Staminal* filaments 9-11

mm long; anthers linear, c. 4 mm long, mucronate. *Style* 15-20 mm long; stigma 3-lobed. *Fruit* turbinate, 2-2.5 mm long. *Hypocotyl* 12-20 mm long, 1.5-2 mm wide, terete or slightly ridged, straight, blunt. *Flowering* and fruiting: all months. Fig. 58

Common in the NT; also Qld, NSW and western Indo-Pacific region. Restricted distribution in the DR. Occupies rear zones of mangrove communities and also known to grow above tidal influence. Bark was used by Macassans to treat Trepan on Groote Eylandt (Levitt, 1981).

### **B. parviflora** (Roxb.) Wight & Arn. ex Griffith

Slender *shrub* or *tree* to 8 m; bark grey, fissured; stem base slightly flanged; pneumatophores up to 300 mm high. *Stipules* lanceolate, 21-40 mm long. Petioles 10-20 mm long. *Leaf blades* elliptic, 55-105 mm long, 18-39 mm wide, margins often scalloped by insect attack, apex acute. *Inflorescences* 3-10-flowered; peduncle 5-10 mm long; pedicel 2-7 mm long. *Flowers* 6-10 mm long; hypanthium 4-6 mm long, slightly ridged. *Sepals* 8, narrowly triangular, c. 2 mm long, apex acute with minute hook. *Petals* 8, oblong, 1.5-2 mm long, 3 bristles on each lobe, 1 bristle in sinus. *Staminal* filaments c. 1.5 mm long; anthers triangular, c. 0.5 mm long. *Style* c. 1.5 mm long; stigma 2-3-lobed. *Fruit* narrowly turbinate, c. 2 mm long. *Hypocotyl* cylindrical, smooth, curved, 80-150 mm long. *Flowering*: June - Sept; fruiting: Sept - Dec. Fig. 58

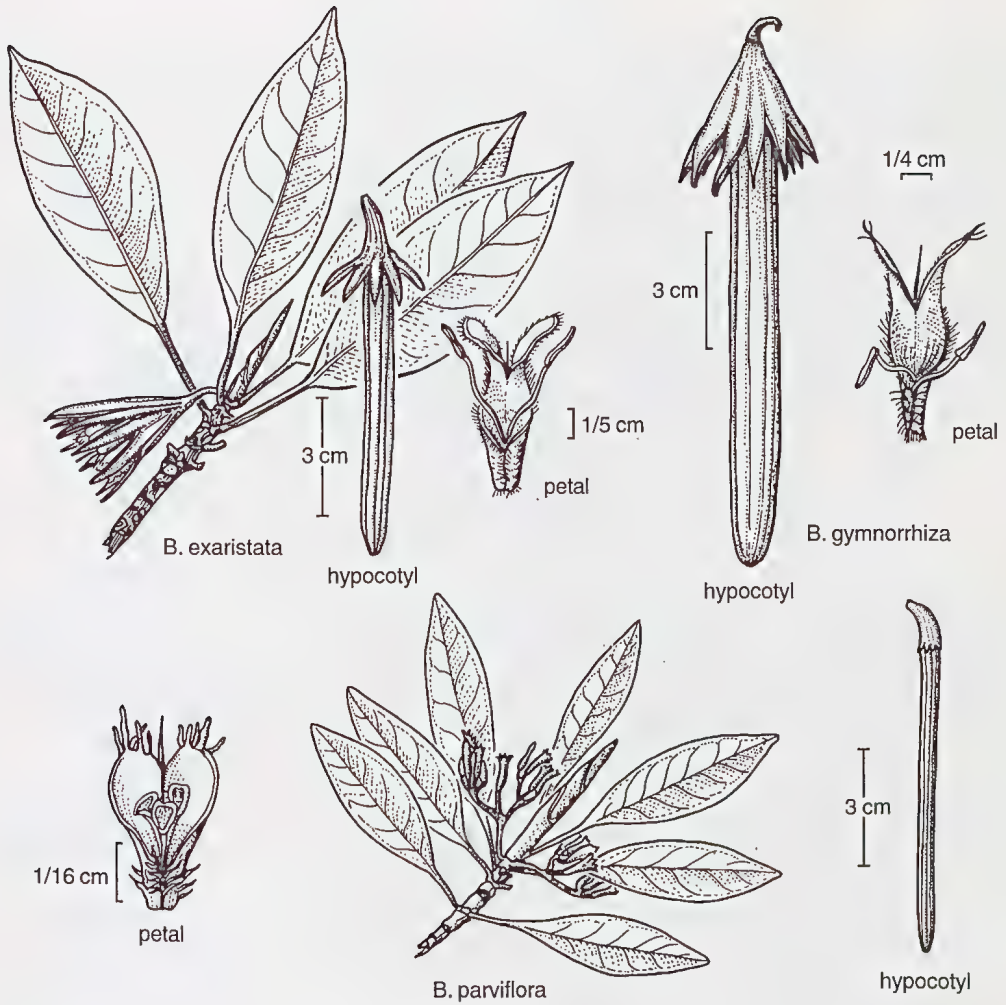
Widespread and common across the NT coastline; also WA, Qld, SE Asia. Occupies mid to rear zones of mangrove communities and regularly forms monospecific stands.

## **CARALLIA** Roxb.

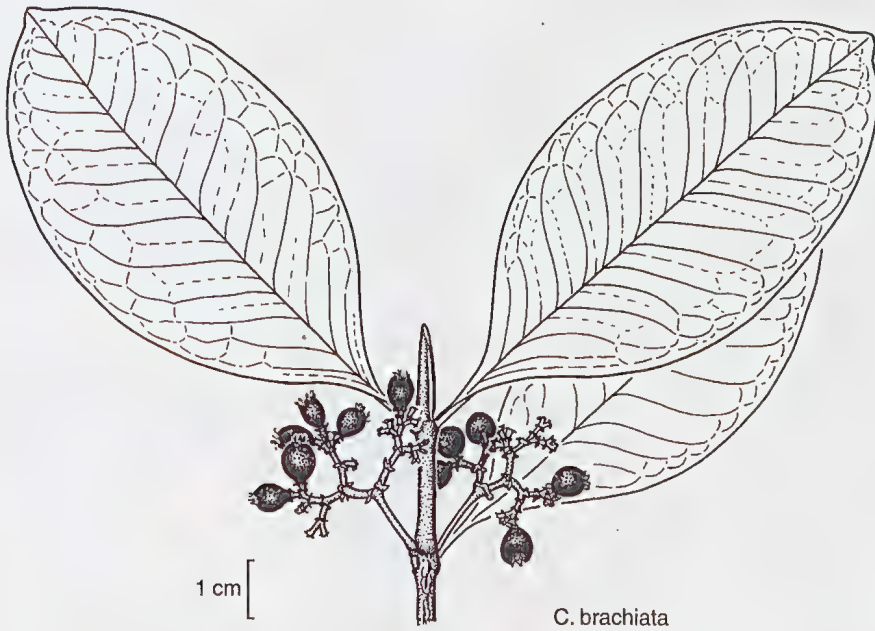
A genus of c. 10 species in the Old World tropics. One species occurs in the NT and in the DR.



## Bruguiera



## Carallia



**C. brachiata** (Lour.) Merr.

Spreading tree to 25 m; bark corky, cream; stem occasionally with buttresses and adventitious roots. Petioles 8-15 mm long. *Leaf blades* discolorous, shiny above, oblanceolate to broadly elliptic, 73-156 mm long, 23-110 mm wide, margin entire or serrulate in juveniles, apex acute. *Inflorescences* of dichasial cymes; bracteoles 2-3, partially united. *Flowers* 3-4 mm long. *Sepals* 5-8. *Petals* 5-8, suborbicular, clawed, c. 1.5 mm long. *Stamens* paired, unequal; anthers ovoid. *Ovary* inferior, ovoid, 5-8-locular, 2-3 mm long; style filiform, c. 2 mm long; stigma

discoid, lobed. *Fruit* globose, 5-7 mm diam., dark red to black. *Seeds* reniform, alveolate, not viviparous. *Flowering*: July - Oct; *fruiting*: Sept - Dec. Fig. 58

Madagascar, India, SE Asia and New Guinea; in Australia widespread across the tropical region. Common in the DR in monsoon vine forests, riparian situations and occasionally open forests. Found on a variety of soil types. Fruit may be eaten raw. Wood used by Aboriginal people for spear shafts, spear heads, fighting sticks, axe handles and music sticks (Specht, 1958).

**CERIOPS** Arn.

Shrubs or small trees to 6 m; stem base buttressed. Stipules lanceolate. Inflorescences of 3-many-flowered dense cymes; bracteoles 2, with connate bases and broad apices. Calyx lobes 5(6). Petals 5(6), each embracing 2 stamens, involute. Stamens 10-12; anthers 4-locular. Ovary half inferior, 3-locular; style terete; stigma simple or obscurely 4-lobed. Fruit ovoid, calyx lobes spreading. Hypocotyl narrowly clavate, terete or angular. [Ballment *et al.*, 1988]

A genus of 3 species, widespread in the Old World tropics including the DR.

- |                                                                                  |                     |
|----------------------------------------------------------------------------------|---------------------|
| 1. Petals fringed; peduncle 5-8 mm long, robust .....                            | <b>C. decandra</b>  |
| 1. Petals with 3 clavate lobes; peduncle 10-20 mm long, slender, pendulous ..... | 2                   |
| 2. Hypocotyls 40-100 mm long, terete; fruit 8-12 mm long .....                   | <b>C. australis</b> |
| 2. Hypocotyls 150-250 mm long, angular; fruit 15-25 mm long .....                | <b>C. tagal</b>     |

**C. australis** (C.T.White) Ballment, T.J.Sm. & J.A.Stoddart

*C. tagal* (Perr.) C.B.Robinson var. *australis* C.T.White

Bark light grey. Stipules 9.5-13 mm long. Petioles 12-28 mm long. *Leaf blades* obovate, rarely elliptic, 30-80 mm long, 14-38 mm wide, base cuneate, margins often involute, apex obtuse. *Inflorescence* resinous, 5-9-flowered; peduncle slender, 6-15 mm long; pedicel 0-2 mm long. *Sepal lobes* oblong, c. 5 mm long, acute. *Petals* oblong, 2.5-4 mm long, margins cohering via marginal hairs, apex with 3 clavate, c. 0.5 mm long lobes. *Staminal* filaments c. 3 mm long; anthers c. 0.5 mm long. Style c. 4 mm long. *Fruit* 8-14 mm long, sepals reflexed. *Hypocotyl* terete, 40-120 mm long. *Flowering*: Apr - Nov; *fruiting*: June - Mar. Fig. 59

Northern Australia and New Guinea. Common along the NT coast and in the DR. Often in monospecific stands at the driest margins of mangroves. Aborigines use an infusion of wood or ash to treat sores and infections (Smith & Wightman, 1990).

**C. decandra** (Griff.) Ding Hou

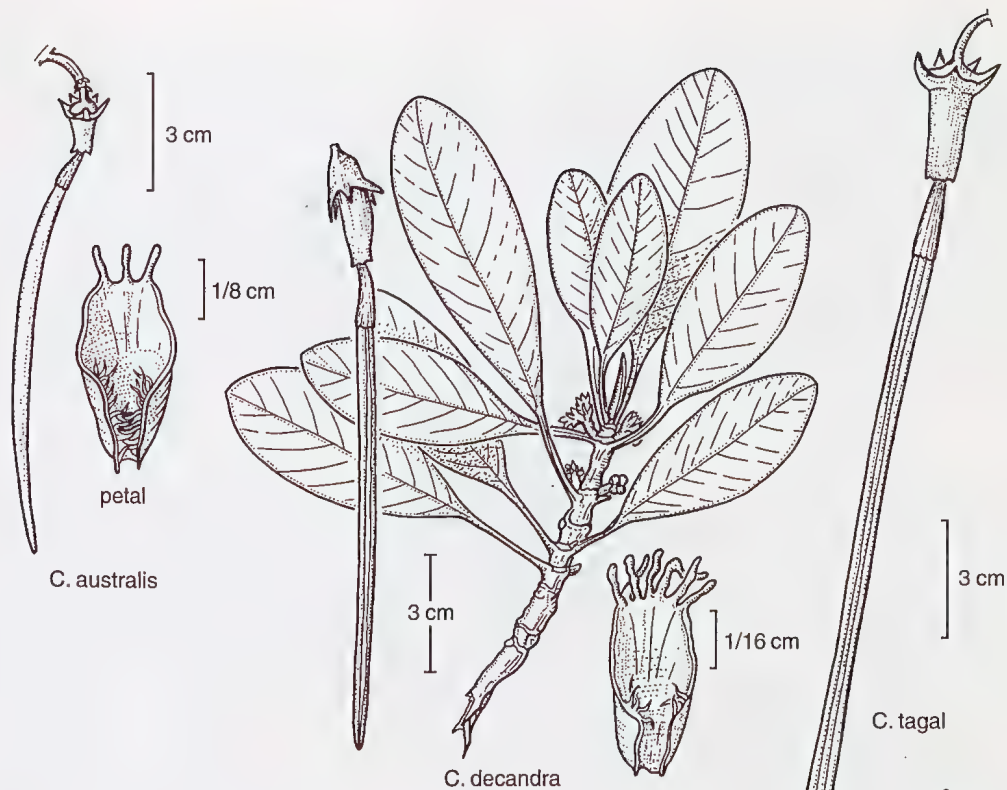
Bark brown, rarely grey or cream, smooth to flaky. *Stipules* 14-22 mm long. Petioles 7-20 mm long. *Leaf blades* slightly discolorous, elliptic-oblong, 30-98 mm long, 13-43 mm wide, base cuneate, apex obtuse or emarginate. *Inflorescences* 2-5-flowered; peduncle stout, angular, 5-8 mm long. *Flowers* sessile. *Sepals* ovate, c. 2.5 mm long. *Anthers* c. 1 mm long. *Style* c. 1 mm long; stigma minutely 4-lobed. *Fruit* ovoid-conical, 15-18 mm long, apex distinctly rounded, sepals erect or ascending. *Hypocotyl* strongly ridged, 90-150 mm long. *Flowering*: May - Nov; *fruiting*: May - Jan. Fig. 59

Qld, New Guinea, India and Malaysia; widespread but not common in the DR and the NT. Occupies mid to rear zones of mangrove communities and never forms monospecific stands.

**C. tagal** (Perr.) C.B.Robinson

Bark grey or occasionally brown, smooth, flaky at base. *Stipules* 8-20 mm long. Petioles 15-25 mm

**Ceriops**



**Rhizophora**

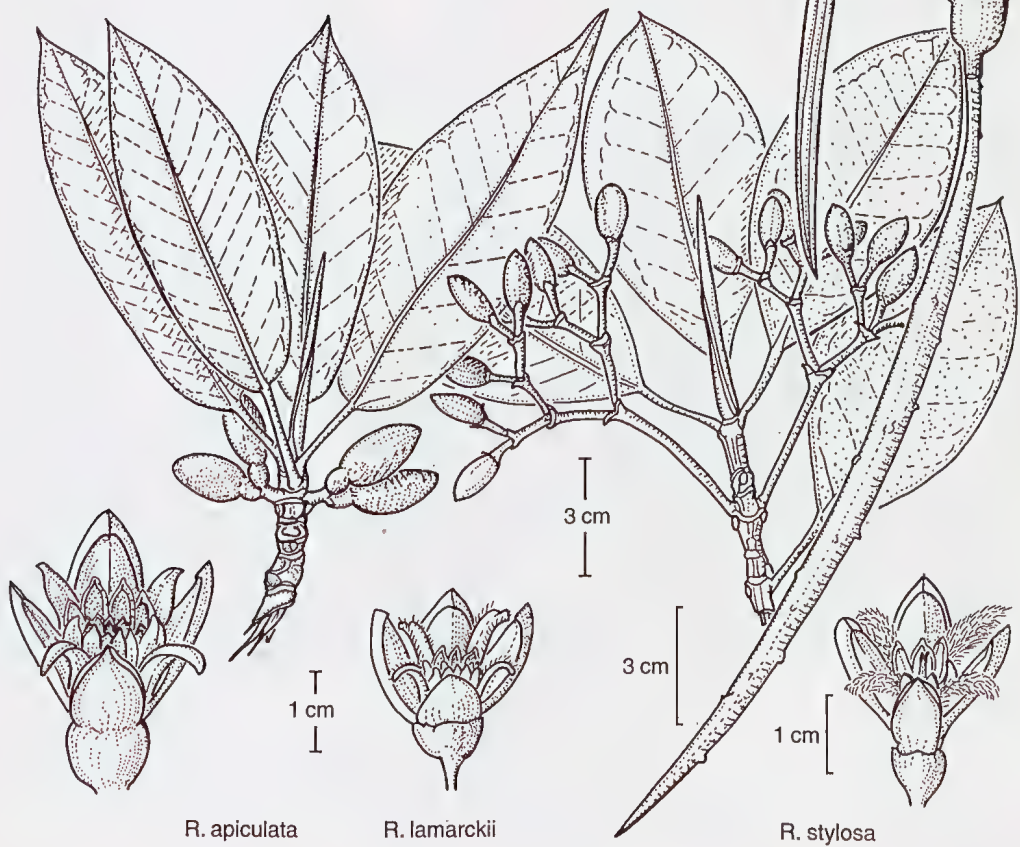


**Fig. 59**



long. Leaf blades obovate-elliptic, 55-100 mm long, 20-34 mm wide, base cuneate, margins often involute, apex obtuse to emarginate. *Inflorescences* resinous, 5-10-flowered, pendulous; peduncle slender, 10-20 mm long; pedicel 1-2 mm long. *Sepals* lanceolate-ovate, c. 4 mm long, acute. *Petals* oblong, c. 4 mm long, margins cohering via marginal hairs, apex with 3 clavate lobes, c. 0.5 mm long. *Staminal* filaments c. 3 mm long; anthers c. 1 mm

long. Style c. 3.5 mm long; stigma simple. *Fruit* 15-25 mm long, sepals reflexed. *Hypocotyl* angular, 150-250 mm long. *Flowering*: June - Nov; fruiting: June - Dec. Fig. 59

From eastern Africa, India, Malaysia, New Guinea to northern Australia. Widespread but uncommon along the NT coast and in the DR. Occupies rear zones of mangrove communities and appears to require some freshwater input.

## RHIZOPHORA L.

Trees; stilt roots arching, prominent. Stipules lanceolate. Leaves with midrib extending to a caducous point. *Inflorescences* axillary, cymose; bracts and bracteoles at flower base and inflorescence dichotomies. *Sepals* 4, reflexed in fruit. *Petals* 4, entire. *Stamens* 4-12; anthers almost sessile, triangular. *Ovary* half inferior; locules 2. *Fruit* obpyriform. *Hypocotyl* cylindrical. [Ding Hou, 1960]

A genus of c. 9 species, 3 in the NT and the DR.

- |                                                                                                           |                      |
|-----------------------------------------------------------------------------------------------------------|----------------------|
| 1. Inflorescences with 3 dichotomies; style >5 mm long;<br>underside of leaf evenly dotted .....          | <b>R. stylosa</b>    |
| 1. Inflorescences with 1 or 2 dichotomies; style <3 mm long;<br>underside of leaf not evenly dotted ..... | <b>2</b>             |
| 2. Inflorescences with 1 dichotomy; peduncles <14 mm long .....                                           | <b>R. apiculata</b>  |
| 2. Inflorescences with 2 dichotomies; peduncles >18 mm long .....                                         | <b>R. lamareckii</b> |

### **R. apiculata** Blume

*Tree*, columnar, to 15 m; bark dark grey, tessellated; stilt roots extending to 3 m up stem. *Stipules* 40-71 mm long. *Petioles* 17-35 mm long. *Leaf blades* dark green with distinct light green zone along midrib, narrowly elliptic, 93-190 mm long, 37-80 mm wide, base attenuate, apex mucronate. *Inflorescences* 2-flowered. *Flower* buds broadly ellipsoidal, finely fissured, subtended by 2 fused cup-shaped, fissured, bulbous bracteoles. *Calyx* lobes concave, ovate, 11-15 mm long, acute. *Corolla* lobes membranous, oblong-lanceolate, 9-10 mm long. *Stamens* 11-12; anthers sessile, 8-10 mm long. *Ovary* bluntly conical, c. 2 mm long; style c. 0.8 mm long, 2-lobed. *Fruit* rough, 30-35 mm long. *Hypocotyl* clavate, 180-370 mm long. *Flowering*: June - Feb; fruiting: June - Nov. Fig. 59

Qld, India and the Pacific; sparsely distributed along the NT coast and in the DR. Occupies mid to rear zones of mangrove communities with strong freshwater influence.

### **R. lamareckii** Montr.

*Tree*, rambling, robust, to 25 m; bark dark grey to black, finely tessellated, coarsely friable; stilt roots

to 6 m up trunk and extending laterally for many metres. *Stipules* 50-70 mm long. *Petioles* 15-25 mm long. *Leaf blades* elliptic, 81-136 mm long, 39-63 mm wide, base broadly cuneate, apex with distinct mucro to 3 mm long. *Inflorescences* with 2 branches, each dichotomy subtended by 2 fused bracteoles; peduncles 18-21 mm long, flattened; pedicels stout, to 4 mm long. *Flower* buds narrowly ovate, 10-12 mm long, subtended by fused bracteoles. *Calyx* lobes deltoid to broadly lanceolate, 9-14 mm long, acute. *Corolla* lobes lanceolate, c. 10 mm long, margins tomentose, acute. *Stamen* number variable; anthers almost sessile, c. 8 mm long. *Ovary* shallowly conical; style c. 2 mm long, terete, 2-4-lobed. *Flowering*: Mar, Apr, June, Aug; fruiting: not observed in NT. Fig. 59

Qld, Sri Lanka, New Guinea, Indonesia and New Caledonia; rare in the NT where known from several populations, 2 of these in the DR at Adelaide R. and Tiwi Islands. Occupies rear zones of mangrove communities with a perennial freshwater input. Associates in the NT are *R. apiculata* and *R. stylosa*. Morphological and field evidence from NT supports a hybrid origin for this species as postulated by Duke & Bunt (1979).

**R. stylosa** Griff.

*Tree*, multitrunked or columnar, to 10 m; bark black, smooth to fissured; stilt roots to 3 m; numerous aerial roots from lower branches. *Stipules* 39-58 mm long. *Petioles* 12-31 mm long. *Leaf blades* broadly elliptic, 65-120 mm long, 33-74 mm wide, under-surface regularly spotted, base broadly cuneate, apex obtuse to acute with prominent mucro to 4 mm long. *Inflorescences* with 3-5 dichotomies, up to 32-flowered; each dichotomy subtended by a 4-lobed bract. *Calyx* lobes broadly lanceolate, 9-13 mm long, acute. *Corolla* lobes lanceolate, 9-11 mm long,

margins woolly, hairs 3-4 mm long. *Stamens* 4-8; anthers almost sessile, 8-9 mm long. *Ovary* depressed conical, c. 1.5 mm long; style c. 6 mm long, terete-filiform, bilobed. *Fruit* 26-31 mm long, neck distinctly contracted. *Hypocotyl* cylindrical, 200-350 mm long. *Flowering* and fruiting: all year. Fig. 59

WA, Qld, NSW, Taiwan, Malaysia, the Philippines, Indonesia and New Guinea. Widespread and common in the DR and elsewhere along the NT coast. Occupies all zones of mangrove communities on a variety of substrates. Timber used for clubs and fire wood (Specht, 1958).

## OLACACEAE

Trees, shrubs or vines; mostly hemiparasitic on roots. Leaves alternate, simple, entire, exstipulate. Flowers bisexual, actinomorphic. Inflorescences axillary, various. Calyx reduced to a rim or lobed. Corolla of 3-4(6) petals, free, valvate. Stamens 3-8, free or epipetalous, anthers basifixed; staminodes 0 or 6. Ovary superior, 1-4-locular; ovules 1 per locule; style simple; stigma globular. Fruit a 1-seeded drupe.

A family of 25 genera and c. 250 species in tropical and temperate regions; 3 genera in Australia with 2 in the NT and the DR. [George, 1984]

- |                                                                        |                |
|------------------------------------------------------------------------|----------------|
| 1. Woody unarmed vine; leaves >100 mm long .....                       | <b>Olax</b>    |
| 1. Shrub or small tree, sometimes spinescent; leaves <60 mm long ..... | <b>Ximenia</b> |

## OLAX L.

A genus of c. 60 species from tropical Africa to Malesia and Australia; 4 species in the NT with 1 in the DR.

**O. imbricata** Roxb.

Woody evergreen *vine*, ± glabrous but sometimes with minute tomentum of simple hairs on petiole and stems. *Petioles* 5-7 mm long. *Leaf blades* coriaceous, lanceolate or ovate to elliptic, 120-200 mm long, 50-103 mm wide, L/B 1.9-2.4. Inflorescence a racemose panicle to 30 mm long; bracts c. 1 mm long, in 2 imbricate rows when young. *Calyx* cupular, entire, minutely ciliate. *Petals* 3, white, linear-oblong, 7.5-9 mm long, thick,

minutely tomentose at apex. *Stamens* 3; staminodes 6, bifid, longer than stamens, filaments adnate to lower part of petal. *Ovary* 1-locular; style subequal to petals. *Fruit* thinly fleshy to leathery, orange, globular, c. 22 mm diam., almost completely covered by the coriaceous, expanded calyx. *Flowering*: Sept; fruiting: Nov. Fig. 60

India through Malesia to the NT: In the DR known from scattered localities in coastal and subcoastal rainforests.

## XIMENIA L.

A genus of 10-15 species in tropical regions; 1 species in Australia.

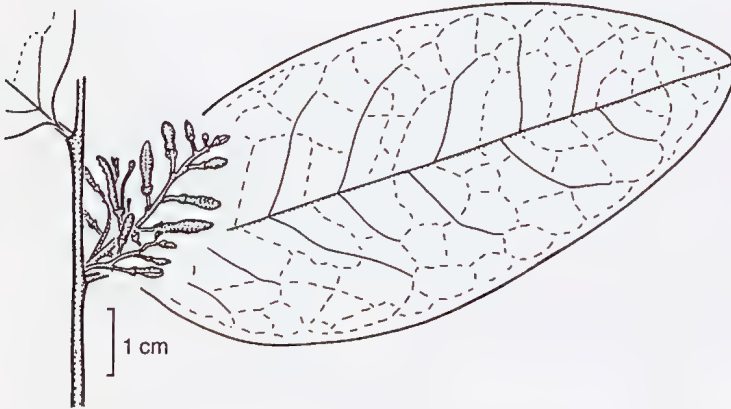
**X. americana L.**

Scrambling or erect *shrub*, rarely a small tree, sometimes spinose, ? deciduous, vegetative parts glabrous. Spines developed from axillary shoot, to 30 mm long. Petioles 5-9 mm long, narrowly winged. *Leaf blades* elliptic to obovate, 30-60 mm long, 10-35 mm wide, L/B 1.5-3,  $\pm$  succulent. *Inflorescence* a subumbellate raceme or cyme, to 15 mm long. *Calyx* 2-4-lobed, tube very short. *Petals* 4, white, linear-

oblong, 7-9 mm long, bearded inside. *Stamens* 8; staminodes absent. *Ovary* 4-locular. *Fruit* pyriform or globular, fleshy, yellow, 17-25 mm long. *Flowering*: Sept - Dec; fruiting: most months. Fig. 60

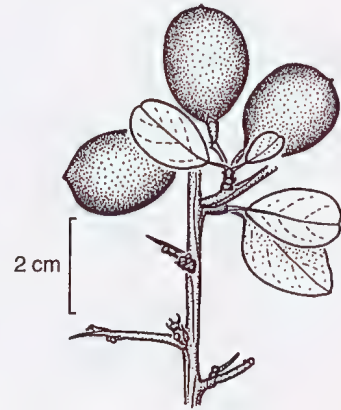
A pantropical species; in Australia from Qld to the NT. Rare in the DR; recorded from Channel Point and Cape Hotham on coastal dunes. The fleshy part of the fruit is edible but the seeds are known to be purgative (Mabberley, 1990).

**Olax**



*O. imbricata*

**Ximenia**



*X. americana*

Fig. 60

**OPILIACEAE**

Evergreen trees or shrubs, sometimes climbing; root hemiparasitic. Leaves distichous, alternate, simple, entire, pinnately veined, exstipulate. Inflorescence of axillary spikes, racemes, umbels, or panicles, sometimes catkin-like. Flowers bracteate, 4-5-merous, bisexual (in Australia). Calyx small and inconspicuous, cupular, entire or lobed. Petals free or connate below. Stamens as many as and opposite the petals, free or filaments borne on petals or on corolla tube. Intrastaminal nectary-disc present. Ovary superior, of 2-5 united carpels, unilocular; ovule 1; style simple or stigma sessile. Fruit a drupe.

A pantropical family of 9 genera and c. 30 species; 2 genera in Australia and the NT, both recorded for the DR. [Hiepko, 1984]

1. Inflorescence bracts deciduous; flowers mostly 3 per bract; petals free;  
fruit to 3 cm long .....

**Opilia**

1. Inflorescence bracts persistent; flowers 1 per bract; petals united;  
fruit to 1.5 cm long .....

**Cansjera**



## CANSJERA A.L.Juss.

A genus of 3 species; 1 species in Australia.

### *C. leptostachya* Benth.

Woody *liane* or erect shrub; branchlets, pedicels and inflorescence with close, crisped, white tomentum. Petiole 2-4 mm long. *Leaf blades* ovate to lanceolate, 29-95 mm long, 10-46 mm wide, L/B 1.6-3.5. *Inflorescence* a spike, 1-4 per axil, 10-15 mm long. Bracts sessile, persistent. Flowers 1-9 per spike. *Perianth* greenish yellow, tubular, c. 2 mm long,

lobes c. 0.5 mm long. *Fruit* orange-red, ellipsoidal to  $\pm$  globular, 9-13 mm long. *Flowering*: July - Sept; *fruiting*: Sept - Dec. Fig. 61

Occurs through E. Malesia to northern Australia from the Kimberley to Cape York. Scattered localities along the Top End coast in coastal vine thicket; rare in the DR where known only from East Point.

## OPILIA Roxb.

A genus of 2 species; from Africa through Asia to northern Australia. Only 1 species in the NT.

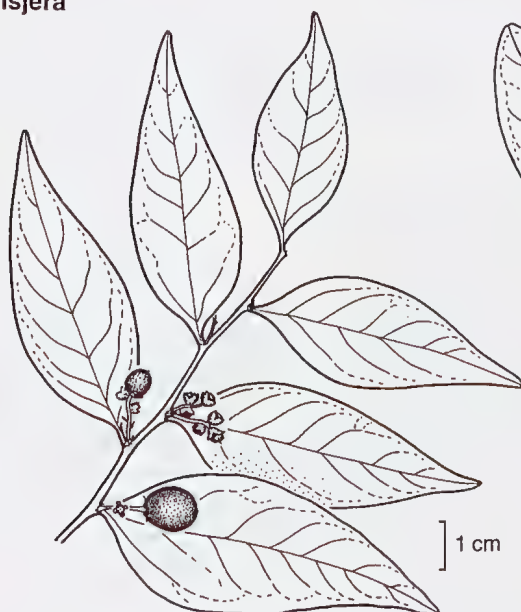
### *O. amentacea* Roxb.

Woody *liane* or scrambling shrub. Young branchlets, inflorescence rachis, pedicels and ovary with minute septate, glandular hairs. Petiole 3-7 mm long. *Leaf blades*  $\pm$  coriaceous, lanceolate or elliptic, 50-140 mm long, 20-54 mm wide, L/B 1.9-2.8. *Inflorescence* racemose, to 35 mm long. Bracts peltate, closely imbricate when young, caducous. Pedicels 1.5-2 mm long. *Perianth* a

single whorl of 5(6), yellowish green, valvate, free tepals. *Stamens* 5-6. Disc with fleshy irregularly dentate lobes alternating with stamens. Stigma sessile. *Fruit* fleshy, pale yellow, ellipsoidal, 15-30 mm long. *Flowering*: Aug - Oct; *fruiting*: Oct - Feb. Fig. 61

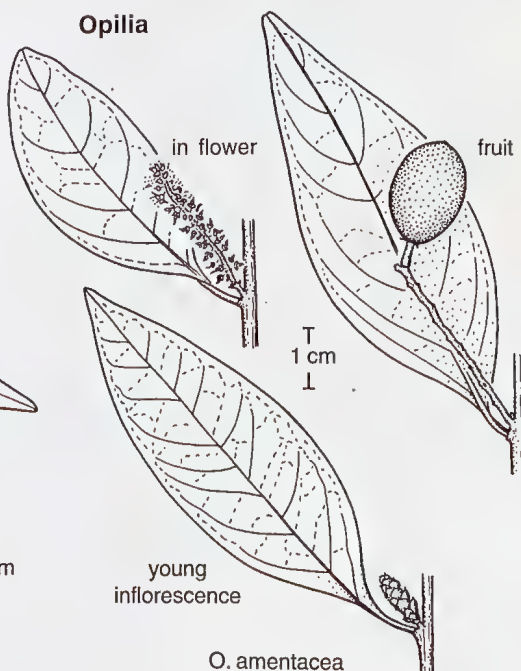
From Africa through Asia, Malesia to northern Australia. Common in the DR in monsoon thickets or open forest. The fruits are edible.

### Cansjera



*C. leptostachya*

### Opilia



*O. amentacea*

SANTALACEAE

Small trees, shrubs, perennial herbs or epiphytic climbers; hemiparasitic on roots or branches. Stipules absent. Leaves opposite or alternate, rarely whorled, simple, entire. Inflorescence various. Flowers actinomorphic. Perianth 1-whorled; tepals 3-5, valvate. Stamens as many as tepals and opposite to them. Ovary inferior or superior, 1-5-locular; ovules 1 per locule; disc usually present. Stigma lobed. Fruit mostly a fleshy drupe. Seed 1.

About 30 genera and 400 species in tropical and temperate regions of the world; in Australia 10 genera. In the NT, 4 genera, all in the DR. [Hewson & George, 1984]

|    |                                             |            |
|----|---------------------------------------------|------------|
| 1. | Aerial stem parasite; vine .....            | Dendromyza |
| 1. | Root parasites; shrubs or small trees ..... | 2          |
| 2. | Leaves opposite .....                       | Santalum   |
| 2. | Leaves alternate .....                      | 3          |
| 3. | Leaves filiform .....                       | Anthobolus |
| 3. | Leaves ovate, elliptic or obovate .....     | Exocarpos  |

ANTHOBOLUS R.Br.

An Australian endemic genus of 3 species; 2 occur in the NT but only 1 in the DR.

A. filifolius R.Br.

Glabrous, dioecious, evergreen *shrub* to 3 m. *Leaves* alternate, sessile, filiform, mucronate, 10-60 mm long. *Male flowers* in axillary, 3-5-flowered umbels or racemes; peduncle 4-10 mm long; bracts minute, caducous; pedicels 1-4 mm long; tepals 3-4, yellow or greenish brown, ovate, obtuse, 1-2 mm long. *Female flowers* in axillary 1-3-flowered umbels or in 3-4-flowered racemes;

peduncle 2-25 mm long; bracts ovate, caducous; pedicels to 19 mm long; tepals 3-5, yellow, oblong-ovate, 1.5-2 mm long; ovary superior; stigma sessile. *Fruit* orange to red, ellipsoid, 5.5-9 mm long. *Flowering* and fruiting: throughout the year. Fig. 62

NT and Qld; rare in the DR where known only from Litchfield NP. Generally in near-coastal localities in open woodland on sandy soils.

DENDROMYZA Danser

A genus of 5 species from New Guinea, Solomon Islands and northern Australia. Only 1 species in the NT.

D. reinwardtiana (Blume ex Korth.) Danser

Stem-parasitic, glabrous, dioecious *vine* or scrambling shrub. Branchlets either twining with haustoria and scale leaves or leafy and non-twining. Normal *leaves* alternate, elliptic to obovate, rounded, 20-100 mm long, 3-9 longitudinal primary veins, abruptly attenuate at base into short petiole. *Flowers* clustered in axils and along branchlets, shortly pedicellate or sessile, subtended by bracts forming an involucre.

*Tepals* 4-5, green, triangular, c. 1 mm long; disc thick. *Male flowers* ± globose on narrowed receptacle; staminal filaments short, thick. *Female flowers* c. 2 mm long; ovary inferior, 1-locular; style short; stigmas 5, erect. *Fruit* pink, ovoid, 6-8 mm long, narrowed at apex and crowned by tepals. Seed pyriform, 5-ribbed. *Flowering* and fruiting: Jan - Sept. Fig. 62

From Sumatra, Luzon to Papua New Guinea. In

Australia known from Cape York and the NT. In the DR known only from 2 sites on Melville Is. in perennially wet vine forest. Parasitic on *Calophyllum*

*soulattri* Burman f. and *Syzygium eucalyptoides* (F.Muell.) B.Hyland subsp. *bleeseri* (O.Schwarz) B.Hyland.

## EXOCARPOS Labill.

A genus of c. 26 species; from Malesia to Australia, New Zealand, Hawaii and New Caledonia. Two species in the NT; only 1 occurs in the DR.

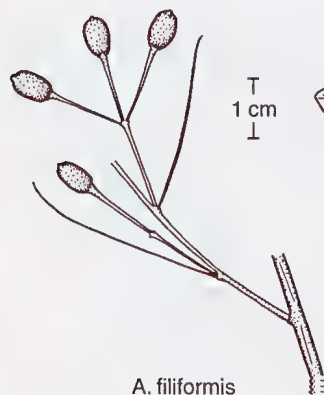
### *E. latifolius* R.Br.

Root parasitic, evergreen *shrub* or small tree to 10 m; bark black, deeply furrowed; root suckering. Glabrous to densely pubescent with minute stellate hairs on all parts. *Leaves* alternate; petioles 2-8 mm long; blades elliptic, obovate or ovate, rounded to acute, 18-110 mm long, 8-62 mm wide, L/B 1.4-2.3; 3-9 longitudinal primary nerves. *Inflorescence* a filiform spike, often clustered or branched, to 40 mm long. *Flowers* bisexual, 5-merous, minute, greenish. Disc

lobes alternating with stamens. *Ovary* superior; stigma sessile. *Fruiting* receptacle swollen below drupe, succulent, maturing yellow or red, obovoid, 5-8 mm long; drupe coriaceous, ellipsoid, 5-10 mm long. *Flowering* and *fruiting*: throughout year. Fig. 62

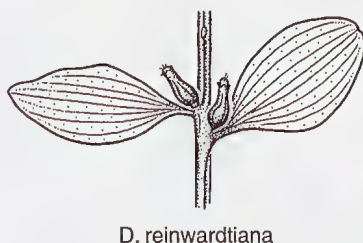
Widespread across northern Australia, also in Malesia and the Philippines. Common in the DR in vine thickets and open forest on a variety of soil types. There is variation in indumentum and leaf size. The fleshy receptacle is edible (Smith & Wightman, 1990).

### Anthobolus



*A. filiformis*

### Dendromyza



*D. reinwardtiana*

### Exocarpos



*E. latifolius*

Fig. 62

## SANTALUM L.

Root-parasitic, glabrous, evergreen shrubs or small trees. Leaves opposite or whorled. Flowers bisexual, in terminal or axillary panicles or racemes, rarely umbelliform; bracts caducous. Tepals 4, usually with hair tufts at base behind stamens. Prominent or slightly developed fleshy lobes alternating with stamens. Ovary inferior; ovules 2-4; style short; stigma small. Fruit dark purple to black, with apical collar.

A genus of c. 25 species from Malesia, Polynesia, Hawaii, Juan Fernandez to Australia. Six species recorded for Australia; 3 in the NT and 2 in the DR.

1. Leaves ovate, rarely narrower, discolorous; lateral veins evident; flowers dark red or green, c. 4 mm long .....

*S. album*

1. Leaves lanceolate to narrowly elliptic, rarely wider, concolorous; lateral veins obscure; flowers white to cream, 6-8 mm long .....

*S. lanceolatum*



**S. album** L.

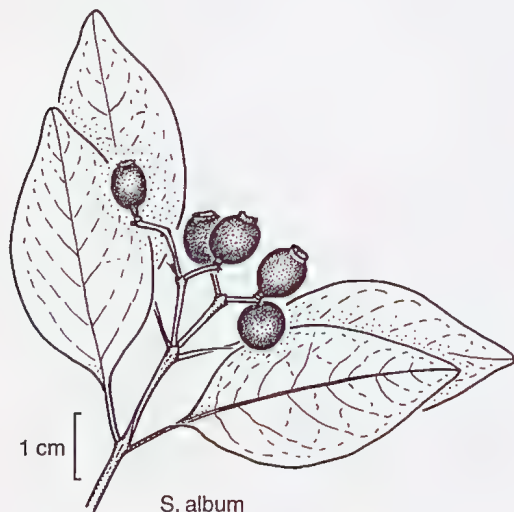
*Shrub* or small tree to 7 m. Bark dark and fissured. Juvenile leaves in whorls of 3. Petioles 9-15 mm long. *Leaf blades* discolourous, ovate to elliptic, 40-90 mm long, 18-44 mm wide, L/B 1.5-2.1, tertiary venation reticulate. *Inflorescence* of small terminal or axillary racemes, panicles or umbelliform, few-flowered, to 25 mm long; pedicels c. 1 mm long. Hypanthium c. 2 mm long. *Tepals* usually dark red or green, c. 2 mm long. *Fruit* ellipsoid or globular, 8-10 mm long. *Flowering*: Dec - July; fruiting: Apr - Sept. Fig. 63 **Sandalwood**

Occurs from India to Hawaii; in Australia restricted to coastal localities between Melville Is. and Groote Eylandt. In the DR known from Darwin and Melville Is. Found in monsoon vine thicket on coastal sand dunes and lateritë. This species is the basis for the Sandalwood trade from India through SE Asia.

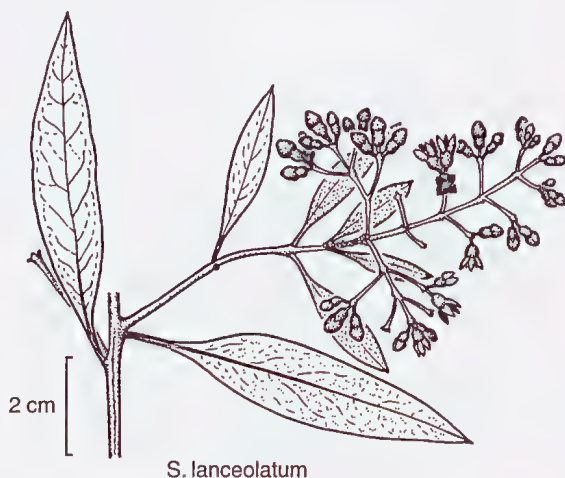
**S. lanceolatum** R.Br.

*Shrub* or small tree to 7 m, usually glaucous. Bark becoming fissured, grey. Petioles 3-10 mm long. *Leaf blades* concolorous or slightly discolourous, narrowly elliptic or narrowly lanceolate to lanceolate, 31-117 mm long, 8-27 mm wide, L/B 2-7.6; tertiary venation obscure. *Inflorescence* of axillary or terminal panicles or racemes, to 50 mm long; pedicels c. 12 mm long. Hypanthium 2.5-3 mm long. *Tepals* pale green or cream to white, 3-4 mm long. *Fruit* ellipsoid, 9-17 mm long. *Flowering*: throughout the year; fruiting: sporadically. Fig. 63 **Sandalwood**

Widespread in tropical and subtropical Australia; common in the DR. In a wide variety of habitats. The fruit is edible and larger stems are occasionally harvested for sandalwood. The inner bark and leaves are used traditionally as medicine (Abor. Comm. NT, 1988).

**Santalum**

S. album



S. lanceolatum

Fig. 63

**LORANTHACEAE**

Hemiparasitic shrubs on branches of woody plants, attached by woody haustoria, with or without epicortical runners. Leaves opposite, whorled or alternate, exstipulate; blade entire, usually penninerved. Flowers bisexual, borne singly or in pairs or 3-flowered dichasia (triads) or tetrads on the inflorescence axis; bract usually 1 per flower. Calyx reduced to an entire, lobed or toothed limb. Petals free or united, usually 4-6, valvate. Stamens as many as petals, epipetalous; anthers 2- or 4-locular, sometimes with transverse partitions, usually basifixed, immobile and introrse. Ovary inferior, with 1-4 obscure locules and lacking differentiated ovules. Style and stigma simple. Fruit usually baccate; seed 1, usually surrounded by a viscous layer.

A family of c. 65 genera and 950 species, widely distributed in tropical regions. Represented in Australia by 12 genera; 5 occur in the NT and 4 in the DR. The Loranthaceae are commonly known as **Mistletoes**. [Barlow, 1984a]

- |                                                                                                                            |                     |
|----------------------------------------------------------------------------------------------------------------------------|---------------------|
| 1. Inflorescence capitate, subtended by 2 enlarged foliaceous bracts<br>which are connate at margins, enclosing buds ..... | <b>Diplatia</b>     |
| 1. Inflorescence not subtended by enlarged foliaceous bracts .....                                                         | <b>2</b>            |
| 2. Petals united to middle or higher .....                                                                                 | <b>Dendrophthoe</b> |
| 2. Petals free to base or almost so .....                                                                                  | <b>3</b>            |
| 3. Petals united for 0.5-3 mm from base, the corolla shed as a single unit;<br>inflorescence a raceme of triads .....      | <b>Decaisnina</b>   |
| 3. Petals free to base, shed separately; inflorescence a pedunculate umbel<br>of triads or variously reduced .....         | <b>Amyema</b>       |

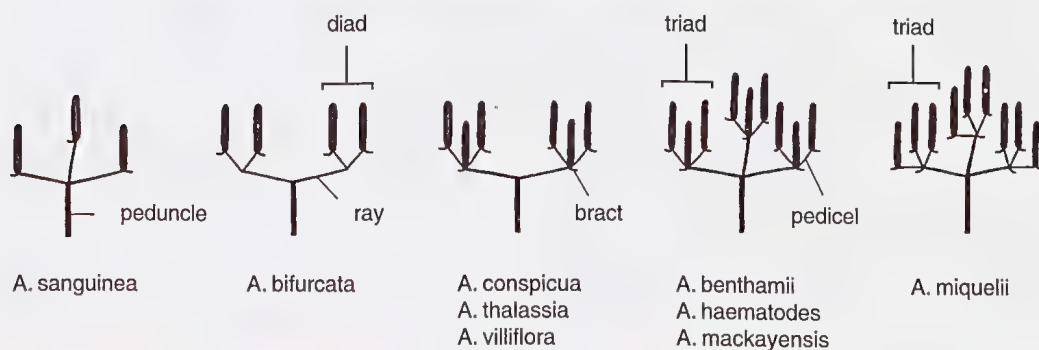
### AMYEMA Tieghem

Pendulous or erect; glabrous or with an indumentum of stellate or branched hairs. Leaves usually opposite or displaced-opposite, rarely alternate or whorled. Inflorescence axillary, basically a pedunculate umbel of triads but variously reduced; rays of umbel 2 to several. Petals 4-6, free. Anthers basifixed, 2- or 4-locular. Style fluted.

A genus of c. 100 species; 36 in Australia and 19 in the NT, of which 9 occur in the DR. [Barlow, 1992]

- |                                                                                 |                      |
|---------------------------------------------------------------------------------|----------------------|
| 1. Leaves sessile and stem-clasping .....                                       | <b>8</b>             |
| 1. Leaves petiolate .....                                                       | <b>2</b>             |
| 2. Inflorescence a simple umbel; flowers mostly 6-merous .....                  | <b>A. sanguinea</b>  |
| 2. Inflorescence an umbel of diads, triads or tetrads; flowers 4-5-merous ..... | <b>3</b>             |
| 3. Inflorescence an umbel of diads .....                                        | <b>A. bifurcata</b>  |
| 3. Inflorescence an umbel of triads or tetrads .....                            | <b>4</b>             |
| 4. Ovary tomentose; rays 2, <5 mm long .....                                    | <b>5</b>             |
| 4. Ovary glabrous; rays 2 or more, usually >5 mm long .....                     | <b>6</b>             |
| 5. Corolla tomentose; petioles >4 mm long .....                                 | <b>A. villiflora</b> |
| 5. Corolla glabrous; petioles <2 mm long .....                                  | <b>A. conspicua</b>  |

### Simple and compound umbels of Amyema (Barlow, 1966)



- |    |                                                                                                                                            |                       |
|----|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 6. | Leaves linear-lanceolate, lanceolate or rarely ovate, not succulent,<br>L/B mostly >3; petiole 9-45 mm long; hosts <i>Eucalyptus</i> ..... | <b>A. miquelii</b>    |
| 6. | Leaves elliptic, ± orbicular to obovate, succulent, L/B <3;<br>petiole <8 mm long; hosts mangroves .....                                   | <b>7</b>              |
| 7. | Flowers 4-merous; corolla strongly 4-angled; calyx flared .....                                                                            | <b>A. thalassia</b>   |
| 7. | Flowers 5-merous; corolla not angled; calyx erect .....                                                                                    | <b>A. mackayensis</b> |
| 8. | Rays of umbel 2, rarely 3; corolla glabrous .....                                                                                          | <b>A. benthamii</b>   |
| 8. | Rays of umbel 3; corolla hairy .....                                                                                                       | <b>A. haematodes</b>  |

### **A. benthamii** (Blakely) Danser

Glabrous except lower part of ovary white-tomentose. *Leaves* opposite, sessile, cordate, elliptic to almost orbicular, 25-85 mm long, 16-40 mm wide, L/B 1.25-4. *Inflorescence* an umbel of triads, 2-4 per axil, the central flower sessile, the laterals pedicellate; peduncle 10-18 mm long; rays of umbel 2(3), 2-6 mm long; pedicels 0-3 mm long; bracts 1.5-2.5 mm long. *Calyx* ± entire, minutely fimbriate or weakly toothed, c. 0.7 mm long. *Corolla* 5-6-merous, green (outside DR recorded as red below, green above), 20-30 mm long, clavate. *Anthers* c. 3 mm long. *Fruit* orange-red, ellipsoid, 8-14 mm long, white tomentose except at apex. *Flowering*: June - Feb; fruiting: June - Oct. Fig. 65

Occurs from the Eastern Goldfields of WA to Arnhem Land; known only from Litchfield NP in the DR. Recorded on a wide variety of hosts in Eucalypt savanna.

### **A. bifurcata** (Benth.) Tieghem var. **bifurcata**

Indumentum of young shoots, flowers, axes of inflorescence and fruits a rusty tomentum of stellate hairs or scales, sometimes various parts glabrous. Petioles 10-40 mm long. *Leaf blades* linear-lanceolate, often falcate, 70-260 mm long, 7-19 mm wide, L/B 8-30. *Inflorescence* an umbel of diads, 1-3 per leaf axil; peduncle 15-40 mm long; rays of umbel mostly 2, 6-20 mm long, strongly divergent; pedicels (0)3-11 mm long; central bract at apex of each ray triangular, c. 1 mm long; lateral bracts orbicular, c. 3 mm long, concave, enlarging in fruit. *Calyx* entire, c. 0.7 mm long. *Corolla* 5-6-merous, orange-red, 22-30 mm long, clavate. *Anthers* 3.5-5 mm long. *Fruit* ellipsoid, 8-12 mm long, with a prominent nipple at apex and persistent style base. *Flowering* and fruiting: all year. Fig. 65

Widespread in northern and central Australia, as far south as NSW; rare in the DR. In Eucalypt savanna; parasitic on *Eucalyptus*.

### **A. conspicua** (Bailey) Danser subsp. **obscurinervis** Barlow

Young shoots, peduncle, upper surface of rays, base of ovary tomentose with whitish branched hairs, otherwise glabrous. Petioles 1-2 mm long. *Leaf blades* elliptic, ovate to obovate, rounded, 30-57 mm long, 6-27 mm wide, L/B 1.7-5.3. *Inflorescence* an umbel of triads, 1-2 per leaf axil, the central flower sessile, the laterals pedicellate; peduncle 4-11 mm long; rays of umbel 2, 1-2 mm long, not strongly divergent; pedicels 0.5-0.7 mm long; bracts of central flower arising from peduncle, longer than and partly enclosing ray; lateral bracts fimbriate, elliptic, 2-2.5 mm long. *Calyx* fimbriate, entire or shallowly lobed, 0.5-1 mm long. *Corolla* 5-merous, greenish, 13-20 mm long, slightly clavate. *Anthers* 1.5-2.5 mm long. *Fruit* globose, c. 7 mm long, with a distinct neck. *Flowering*: Nov - Feb; fruits not seen. Fig. 65

The subspecies is uncommon in the Top End and recorded only from the Katherine area, Mainoru, Douglas-Daly and Arnhem Land. In Eucalypt savanna; parasitic on *Gardenia*, *Terminalia* and *Erythroxylum*.

### **A. haematodes** (Schwarz) Danser

Young shoots, inflorescence and fruit whitish tomentose, otherwise glabrous. *Leaves* opposite, sessile, stem-clasping and bases of the leaf pair overlapping; ovate, lanceolate or deltoid, 41-95 mm long, 21-47 mm wide, L/B 1.3-3. *Inflorescence* an umbel of triads, 1-3 per leaf axil, the central flower sessile, the laterals pedicellate; peduncle 7-15 mm long; rays of umbel 3, 2-3 mm long; pedicels 1-1.5 mm long; bracts 1.2-2 mm long. *Calyx* entire, c. 0.5 mm long. *Corolla* 5-6-merous, greenish to yellow, 21-28 mm long, clavate. *Anthers* 2.5-4 mm long. Immature fruit ellipsoid, to 12 mm long with a distinct neck. *Flowering*: July - Jan; fruits not seen. Fig. 65

An NT endemic; in the DR from Tiwi Islands, near Darwin, the Howard R. and Litchfield NP. Mostly in coastal vine thicket; parasitic on *Mallotus*, *Ficus* and *Barringtonia*



**A. mackayensis** (Blakely) Dansersubsp. *cycnei-sinus* (Blakely) Barlow

Glabrous. *Leaves* fleshy; petioles 2-7 mm long; blades elliptic to obovate, 20-58 mm long, 10-41 mm wide, L/B 1.4-2.9. *Inflorescence* an umbel of triads, the central flower sessile, the laterals pedicellate; peduncle 4-11 mm long; rays of umbel 2-4, 4-8 mm long, strongly divergent; pedicels 2-4 mm long; bracts fimbriate, c. 1 mm long. *Calyx* entire, c. 0.5 mm long. *Corolla* 5-merous, base red, upper part green, 11-20 mm long, clavate. *Anthers* 1-2.5 mm long. *Fruit* ellipsoid, 6-12 mm long, crowned with calyx. *Flowering*: Jan - Aug; fruiting: Apr - Oct. Fig. 65

In northern Australia from the Kimberley to Torres Strait including southern New Guinea; common in the DR. Occurs in mangroves on a number of genera. [Wightman, 1979]

**A. miquelii** (Lehm. ex Miq.) Tieghem

Glabrous or sparsely scurfy on calyx and ovary. Petioles 9-45 mm long. *Leaf blades* linear-lanceolate, lanceolate or rarely ovate, straight or falcate, 40-180 mm long, 8-27 mm wide, L/B 2-16. *Inflorescence* an umbel of triads, rarely tetrads or diads; all flowers pedicellate or if tetrads then one flower sessile; peduncle 9-40 mm long; rays of umbel 3-4, 7.5-15 mm long, strongly divergent; pedicels 3.5-8 mm long; bracts 0.7-1.5(3) mm long. *Calyx* shallowly lobed or entire, 0.3-0.6 mm long. *Corolla* red, 15-25 mm long, clavate. *Anthers* 2-5 mm long. *Fruit* glaucous,  $\pm$  globular, 9-14 mm long. *Flowering* and fruiting: Feb - Nov. Fig. 65

Widespread throughout mainland Australia in Eucalypt savanna. Rare in the DR where recorded from Gunn Point and Litchfield NP. Parasitic on many species of *Eucalyptus*.

**A. sanguinea** (F.Muell.) Danser var. *sanguinea*

Foliage pendulous but with flowers erect and borne on previous and current years wood; glabrous. *Leaves* whorled, opposite or alternate; petioles 5-20 mm long; blades narrowly to broadly elliptic, oblanceolate or oblong, frequently falcate, 50-135(200) mm long, 8-52 mm wide, L/B 2-19. *Inflorescence* an umbel of 3-5 flowers; peduncle 4-15 mm long; pedicels 4-7 mm long; bracts 1-4 mm long. *Calyx* shallowly lobed or entire, c. 1 mm long. *Corolla* mostly 6-merous, red, deep pink or yellow-orange, 27-56 mm long, clavate. *Anthers* 3-12 mm long. Stigma large, capitate, black. *Fruit* funnel-shaped, 12-18 mm long. *Flowering*: Oct - Jan; fruiting: Feb - May. Fig. 65

Scattered throughout northern Australia and extending into the arid zone of WA, NT and SA.

Relatively common in the DR on a number of species of *Eucalyptus*. Barlow (1984a) has recognised two varieties (the typical and var. *pulchra* (Ewart) Barlow) which he distinguishes on leaf shape, leaf dimensions and corolla length. The variety *pulchra*, which is centred in the Katherine region and extends to Darwin can be distinguished by the following key.

1. Flowering stems mostly 10 mm or more diam.; leaves >30 mm wide ..... var. **pulchra**
1. Flowering stems mostly less than 6 mm diam.; leaves <30 mm wide ..... var. **sanguinea**

**A. thalassia** Barlow

Glabrous. *Leaves* fleshy; petioles 4-8 mm long; blades orbicular to obovate, 20-45 mm long, 12-30 mm wide, L/B 1-1.8. *Inflorescence* an umbel of triads, central flower sessile, the laterals pedicellate; peduncle 5-11 mm long; rays of umbel 2-3, 8-10 mm long; pedicels 3-6 mm long; bracts 0.5-1.7 mm long. *Calyx* entire to shallowly 4-lobed, c. 1 mm long, flared. *Corolla* 4-merous, red or red at base and green above, 10-20 mm long, clavate, strongly 4-angled. *Anthers* c. 2.5 mm long. *Fruit* obconic to ellipsoid, c. 10 mm long. *Flowering*: Jan - Feb; fruiting: May - June. Fig. 65

An Australian endemic occurring from the Kimberley to Qld. Confined to mangroves; common in the DR on *Avicennia* (Wightman, 1979).

**A. villiflora** (Domin) Barlow

Young stems, inflorescence, calyx, corolla, ovary and fruit with dense whitish or rusty close tomentum. Petioles 4-10 mm long. *Leaf blades*  $\pm$  orbicular, elliptic to oblanceolate, 26-92 mm long, 8-42 mm wide, L/B 1.3-4. *Inflorescence* an umbel of triads, 1-2 per axil, central flower sessile, laterals pedicellate; peduncle 5-19 mm long; rays of umbel 2, 1.5-5 mm long, not strongly divergent; pedicels 0-2 mm long; bracts 1-2.5 mm long. *Calyx* c. 1 mm long. *Corolla* 5-merous, yellow or orange to red at base, greenish at tips, 17-30 mm long, clavate. *Anthers* 1.5-3 mm long. *Fruit* orange to red, ellipsoid, 8-12 mm long, with neck. *Flowering*: Nov - June; fruiting: Jan - Sept. Fig. 65

Across northern Australia. Common in the DR in coastal vine thickets, predominantly on *Terminalia* and *Pouteria* but also recorded on a variety of other hosts.

Barlow (1984a) recognises 2 subspecies, the typical and subsp. *tomentilla* (Blakely) Barlow; both being recorded from the DR. They are not readily distinguishable in the DR and so not recognised here.

## DECAISNINA Tieghem

A genus of c. 30 species distributed from the Philippines, Tahiti to northern Australia; c. 6 species in Australia with 3 recorded in the NT. Only *D. signata* is recognised for the DR.

### *D. signata* (F.Muell. ex Benth.) Tieghem

Glabrous. *Leaves* sessile or shortly petiolate; blades lanceolate to broadly lanceolate or elliptic, straight or falcate, 40-175 mm long, 15-65 mm wide, L/B 1-5, truncate or cordate at base, apex acute to rounded. *Inflorescence* axis 30-65 mm long, bearing 2-7 pairs of triads on peduncles 1.5-7.5 mm long; all flowers sessile; bracts c. 2 mm long. *Calyx* entire or shallowly lobed, 0.5-1.3 mm long. *Corolla* 6-merous, red below, usually green or cream above, 18-34 mm long; petals united at base. *Fruit* orange, often with pale longitudinal stripes, ellipsoid, 7-10 mm long. *Flowering* and fruiting: most months. Fig. 66, front cover.

From the Kimberley to Arnhem Land. Common in the DR in monsoon forest and woodland. Host trees are genera associated with monsoon forest. In Darwin it is common on many ornamental species.

*D. signata* is part of a complex within which Barlow (1984a) recognises 3 species, each with two subspecies. The two subspecies under *D. signata* differ by subsp. *cardiophylla* (Domin) Barlow having sessile leaves with a cordate base while the typical subspecies has shortly petiolate leaves with a truncate base. The other two closely related species, *D. brittenii* (Blakely) Barlow and *D. petiolata* (Barlow) Barlow, differ from *D. signata* and each other only on leaf shape. *D. brittenii* has linear to narrowly lanceolate leaves and is found typically on *Melaleuca* or *Barringtonia* in swamps or coastal floodplains. Within the DR it is known only from the Wildman/Mary River area. *D. petiolata* has broader, more elliptic leaves. It is also rare in the DR with collections only from the Tiwi Islands. An examination of NT material shows a continuum of variation in leaf shape between all these taxa. Consequently they are not recognised here.

## DENDROPTHOE Mart.

Leaves displaced opposite (in NT). Inflorescence an axillary raceme. Petals 5, united to middle or higher into a curved tube, corolla in bud abruptly narrowing in apical third. Anthers basifixed, 4-locular.

A genus of c. 30 species distributed from tropical Africa to Australia. Three species in the NT; 2 occur in the DR.

- |                                                                       |                              |
|-----------------------------------------------------------------------|------------------------------|
| 1. Inflorescence glabrous or ovary with sparse white indumentum ..... | <b><i>D. glabrescens</i></b> |
| 1. Inflorescence and ovary with whitish tomentum .....                | <b><i>D. odontocalyx</i></b> |

### *D. glabrescens* (Blakely) Barlow

Glabrous or ovary sparsely hairy. Petioles 5-12 mm long. *Leaf blades* lanceolate to elliptic, 40-135 mm long, 15-50 mm wide, L/B 1.8-4.9. *Inflorescence* axis 8-35 mm long, flowers 3-9; pedicels 2-6 mm long; bracts c. 2 mm long. *Calyx* entire or weakly toothed, 1-1.5 mm long. *Corolla* orange, 26-40 mm long. *Fruit* red, ellipsoid, 7-12 mm long. *Flowering*: Feb - Oct; fruiting: Jan - July. Fig. 66

Widespread from WA to NSW. In the DR known only from Wangi Station. Mostly in savanna on *Eucalyptus*, *Melaleuca*, *Erythrophleum* and other genera.

### *D. odontocalyx* (F.Muell. ex Benth.) Tieghem

Young shoots, inflorescence, calyx, corolla and ovary white tomentose. Petioles 4-10 mm long. *Leaf blades* almost linear to elliptic or lanceolate, 43-140 mm long, 5-47 mm wide, L/B 2.3-16. *Inflorescence* axis 5-20 mm long, with 3-6 flowers; pedicels 2-4 mm long; bracts 1.5-2.5 mm long. *Calyx* c. 1 mm long, prominently toothed. *Corolla* orange to red, 15-40 mm long. *Fruit* ellipsoid to ovoid, 12-13 mm long. *Flowering*: most months; fruiting: July - Nov. Fig. 66

From WA to Qld; common in the DR in Eucalypt savanna. Found on a wide variety of hosts.

# Amyema

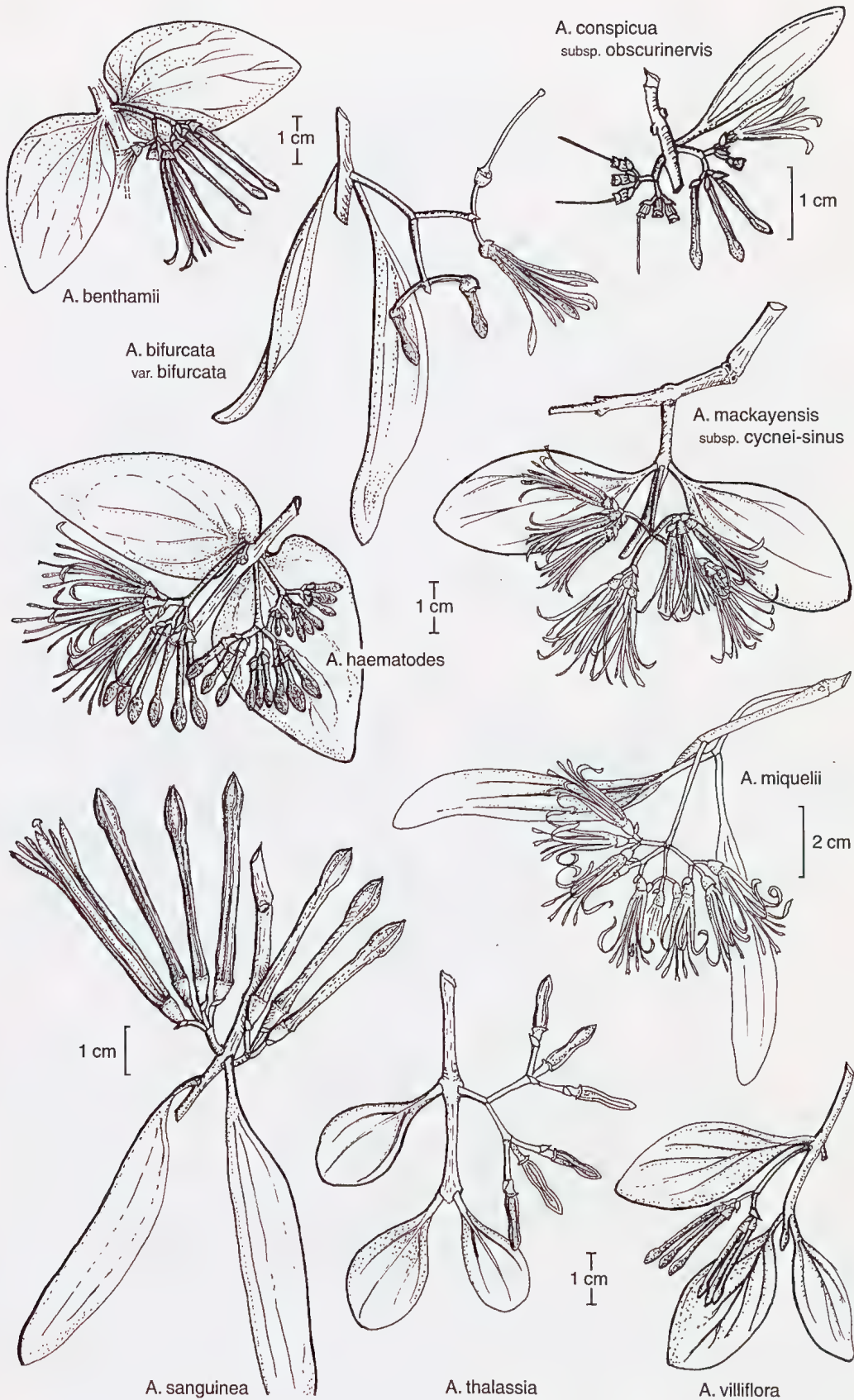


Fig. 65



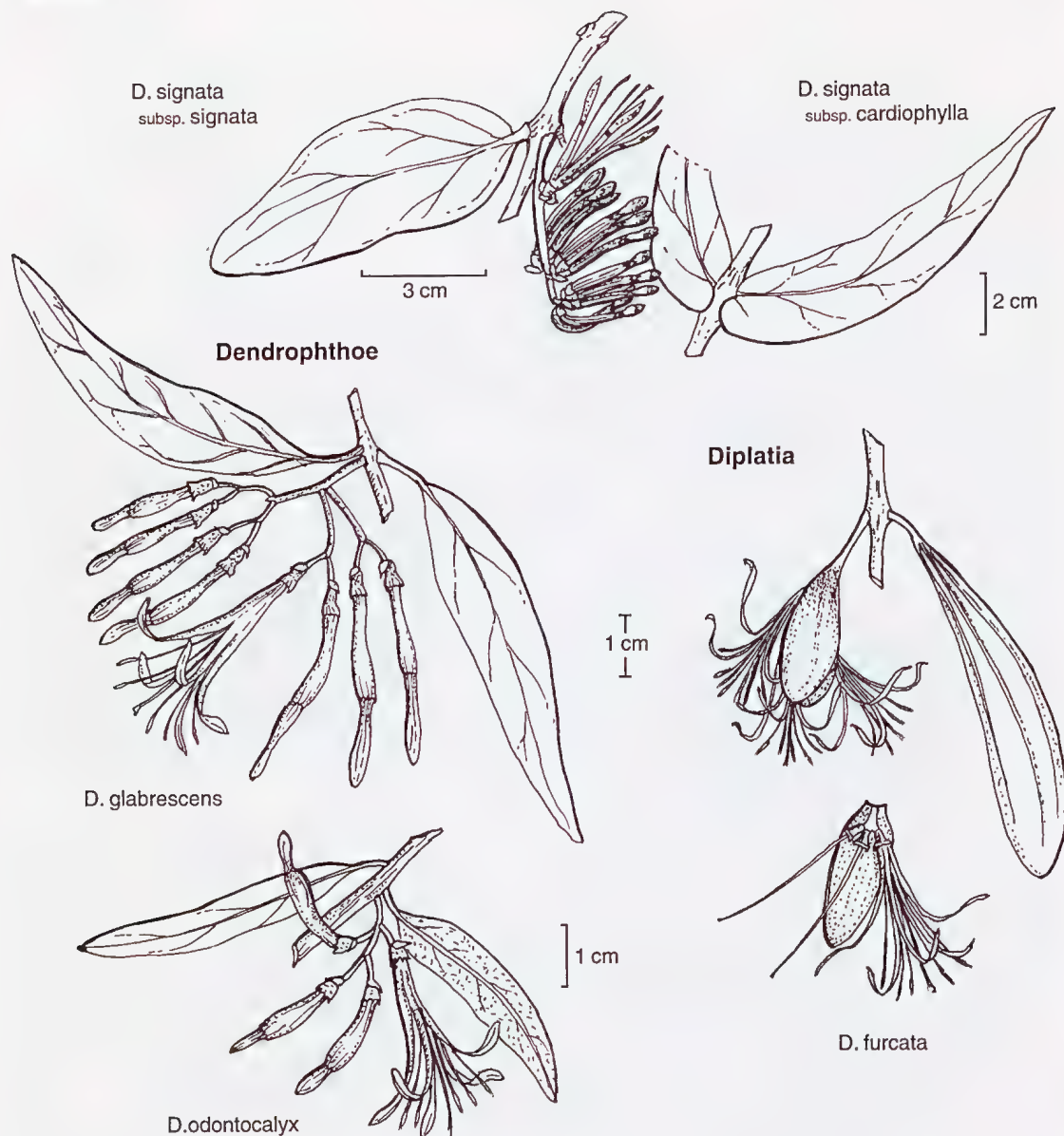


Fig. 66

## DIPLATIA Tieghem

A genus of 3 species endemic in Australia. Only 2 species in the NT and 1 found in the DR.

### *D. furcata* Barlow

Glabrous. *Leaves* opposite; petioles 3-18 mm long; blades spatulate to narrowly oblanceolate, 30-100 mm long, 4-20 mm wide, L/B 2-13. *Inflorescence* axillary, a head of 2 opposite sessile triads; peduncle 10-15 mm long, dilated and flattened at apex; central bracts of triads foliaceous, elliptic, enveloping

inflorescence, 16-30 mm long; lateral bracts linear, caducous. *Calyx* entire, minute. *Petals* 5, free, green, 20-35 mm long. *Anthers* basifixed, 4-locular. *Fruit* obovoid, 10-11 mm long. *Flowering*: Apr - Sept; *fruiting*: Jan - Apr. Fig. 66

In the NT and Qld; in the DR, on the Wildman R. In savanna on various genera of Myrtaceae.

## VISCACEAE

A family of 7 genera and c. 400 species; most in the tropics. In Australia 3 genera and 14 species with only *Viscum* recorded in the NT. The Viscaceae are commonly known as **Mistletoes**. [Barlow, 1984b]

### VISCUM L.

Slender, pendulous, glabrous epiphytic hemiparasitic shrubs on branches of woody plants or other parasites. Leaves opposite, entire, exstipulate, or reduced to small scales and apparently absent. Inflorescence a sessile or pedunculate cyme of (1)3(5) small flowers subtended by a boat-shaped pair of bracts. Plants monoecious (outside Australia dioecious). Tepals 2-4, triangular. Male flower: stamens opposite tepals, anther sessile on each tepal. Female flower: ovary inferior, without differentiated locules or ovules. Fruit berry-like with a single seed, globular or ellipsoidal; stigma present as a very small nipple at apex.

A genus of c. 100 species from Madagascar, Africa to Europe, Asia and Malesia. The usual hosts are dicotyledonous trees, in particular for the NT, *Eucalyptus* and *Melaleuca*. However, the NT species also parasitise other mistletoes and *Exocarpos*. Four species in Australia with 2 recorded for the NT. Only 1 species is known for the DR but both NT species are included here.

- |                                                                 |                       |
|-----------------------------------------------------------------|-----------------------|
| 1. Leaves reduced to small scales .....                         | <b>V. articulatum</b> |
| 1. Leaves oblanceolate to narrowly obovate, 26-45 mm long ..... | <b>V. whitei</b>      |

#### **V. articulatum** Burman f.

Internodes compressed-quadrangular. *Leaves* reduced to an inconspicuous limb subtending inflorescences. *Inflorescence* of several sessile axillary flowers; first flower usually female and solitary; male flowers usually in a pair below the female, subsequent flowers mostly female. *Male flowers* pyramidal, c. 1 mm long. *Female flowers* broadly cylindrical; tepals c. 0.5 mm long; ovary c. 0.5 mm long. *Fruit*  $\pm$  translucent, white, pale yellow or pink, globular, 4-6 mm diam. *Flowering* and fruiting: all year. Fig. 67

Common in northern Australia and extending southwards to the central coast of NSW. Also from New Guinea through to India and southern China. Widespread in the DR, where recorded as parasitic on *Exocarpos latifolius* and *Decaissina*.

#### **V. whitei** Blakely subsp. **flexicaule** (Barlow) Barlow

Internodes terete or  $\pm$  compressed-angular. *Leaves* oblanceolate or narrowly obovate, 26-45 mm long, 5-10 mm wide, attenuate into an obscure petiole. *Inflorescence* a pedunculate axillary cyme of 3-5 flowers, the central flower male or all flowers female; peduncle 3-10 mm long; bracts c. 1.5 mm long. *Male flowers* orbicular, c. 1.8 mm diam., 2-merous, on stipe c. 1 mm long. *Female flowers* cylindrical; tepals 2-

3, c. 1 mm long. *Fruit*  $\pm$  translucent, ovoid, c. 5 mm long. *Flowering* and fruiting: Apr - Aug. Fig. 67

This subspecies occurs in Eucalypt savanna from the Kimberley to western Arnhem Land but is not recorded from the DR. Recorded host plants are *Melaleuca*, *Eucalyptus* and *Dendrophthoe*.

#### Viscum

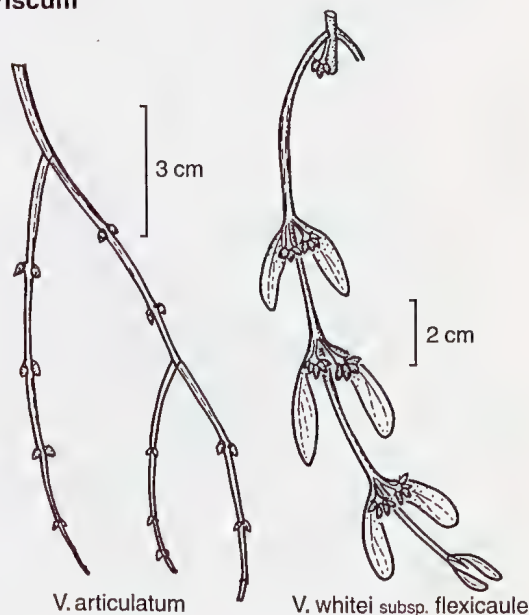


Fig. 67

CELASTRACEAE

Glabrous trees or shrubs. Stipules minute. Leaves simple, alternate or opposite. Inflorescence cymose or racemose, bracteate. Flowers actinomorphic, bisexual or unisexual. Perianth 3-5-merous. Petals imbricate. Stamens 2-5, filaments inserted on or beneath a usually conspicuous disc. Ovary superior or half inferior, usually partly immersed in disc, 1-10-locular with 1-many ovules per locule; stigma (in DR) sessile. Fruit a capsule or a drupe. Seeds often arillate.

A pantropical family of about 50 genera and 800 species with 14 genera and 34 species in Australia. Five genera and 6 species in the NT with 3 genera in the DR. [Jessup, 1984a]

|    |                                                                |          |
|----|----------------------------------------------------------------|----------|
| 1. | Leaves opposite; fruit indehiscent .....                       | Cassine  |
| 1. | Leaves alternate; fruit dehiscent .....                        | 2        |
| 2. | Fruit 4-8 mm long, coriaceous; aril of seed basal, white ..... | Maytenus |
| 2. | Fruit 20-40 mm long, woody; aril enveloping seed, red .....    | Denhamia |

CASSINE L.

About 80 species, pantropical; 2 species in Australia with 1 in the NT.

**C. melanocarpa** (F.Muell.) Kuntze  
*Elaeodendron melanocarpum* F.Muell.

Dioecious evergreen *shrub* or small tree to 6 m. Bark smooth, grey. Stipules caducous. *Leaves* opposite; petioles 7-11 mm long; blades obovate to elliptic, 50-130 mm long, 22-90 mm wide, L/B 1.6-2.5, coriaceous, dentate. *Inflorescence* a short axillary cyme. *Petals* 3(4), ovate, 1.5-2 mm long. Disc swollen, fleshy. *Male flowers*: calyx irregularly lobed; stamens 3, inserted on disc

margin. *Female flowers*: sepals 3-4, often with short lobes between; staminodes 3(4); ovary conical, 3-locular; stigma entire. *Fruit* a drupe, black, hard, shiny, globular, 15-20 mm diam. *Seeds* 1-3. *Flowering*: Aug - Mar; fruiting: most months. Fig. 68

Coastal or subcoastal regions of northern Australia to southern Qld. Rare in the DR where known from Tipperary and the headwaters of the Adelaide R. Commonly in coastal vine thickets.

DENHAMIA Meissner

An Australian endemic genus of c. 7 species; 1 species in the NT.

**D. obscura** (A.Rich.) Meissner ex Walp.

Evergreen small *tree* to 9 m; trunk fluted. Bark smooth, pale grey, becoming dark and rough. *Leaves* alternate; petioles 5-10 mm long; blades discolorous, lower surface with pale waxy cuticle, elliptic or oblanceolate, 50-120 mm long, 9-38 mm wide, L/B 2.7-5.4, entire; juvenile leaves coarsely dentate and holly-like. *Inflorescence* cymose, paniculate, to 110 mm long. *Flowers* bisexual, greenish. *Sepals* 5, c. 1.3 mm long. *Petals* 5, 2-3.5 mm long. *Stamens* 5, inserted on margin of annular disc. *Ovary* partly

immersed in disc, imperfectly (2)3-locular, 6(7) ovules per locule; stigmas 3. *Fruit* a capsule, pale greenish yellow, ovoid or globular, 25-40 mm long, woody. *Seeds* 5-6 mm long, enveloped in red aril. *Flowering*: June - Sept; fruiting: May - Dec. Fig. 68

Occurs from the Kimberley, disjunctly to Arnhem Land. Common in the DR in Eucalypt savanna on a variety of well drained soils. The inner bark of the roots is bright yellow to orange and is readily flammable.



## MAYTENUS Molina

About 200 species, pantropical and subtropical; 7 species in Australia with 2 species in the NT and 1 recorded in the DR.

### **M. ferdinandi** Jessup

Deciduous tree to 8 m. Bark smooth, grey. *Leaves* alternate; petioles 9-13 mm long; blades slightly discoloured, elliptic, lanceolate, obovate, 40-100 mm long, 20-50 mm wide, L/B 1.8-3, entire. *Inflorescences* borne on old wood, racemose; bracts and bracteoles erose. *Flowers* bisexual, white. *Sepals* 5, erose. *Petals* 5, 6-7 mm long. *Stamens* 5, inserted

on margin of flattened notched disc. *Ovary* 2-3-locular, ovules 2 per locule; stigma 2-3-lobed. *Fruit* a capsule, ellipsoid, 4-8 mm long, 2-3-valved. *Seeds* 1-3, vernicose, red-brown; aril white, basal, fleshy. *Flowering*: Nov - Jan; *fruiting*: Dec - Mar. Fig. 68

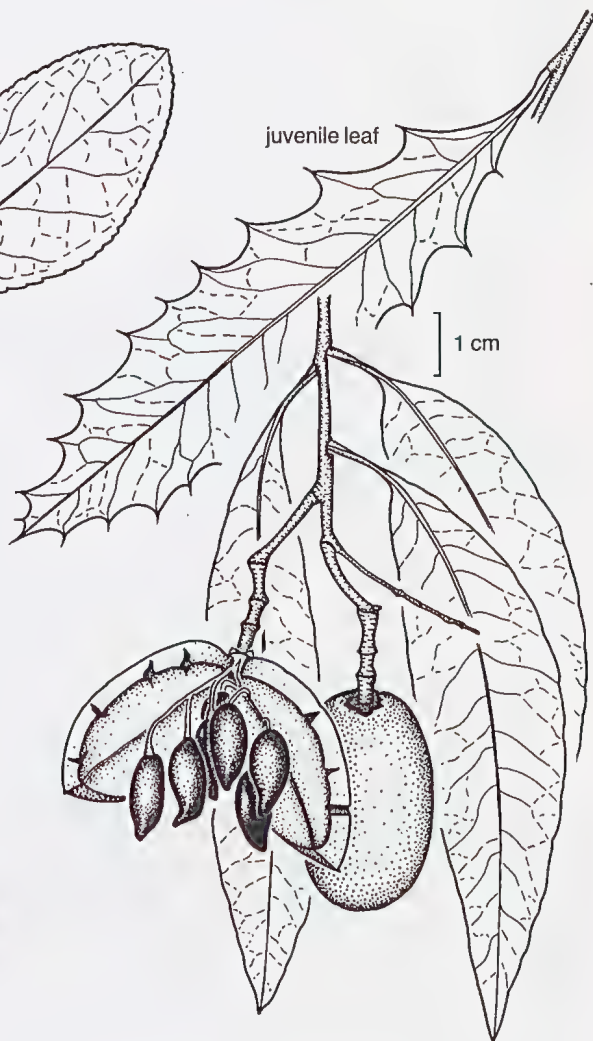
Occurs from the Kimberley to western Arnhem Land. Rare in the DR where known from Acacia Hills and Virginia. Associated with sandstone in Eucalypt savanna or edges of monsoon forest.

### Cassine



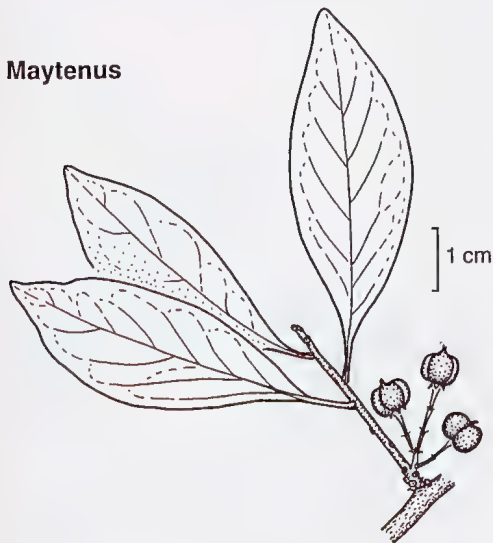
*C. melanocarpa*

### Denhamia



*D. obscura*

### Maytenus



*M. ferdinandi*

## HIPPOCRATEACEAE

A family of about 300 species with poorly defined generic limits. As recognised in Australia there are 2 genera and 4 species. Only 1 genus recorded for the NT. [Jessup, 1984b]

### SALACIA L.

A pantropic genus of c. 150 species with 3 species in Australia; 1 recorded for the DR.

#### **S. chinensis** L.

Deciduous, glabrous *liane* or scandent shrub. Stipules small. *Leaves* simple, opposite or subopposite; petioles 7-13 mm long; blades elliptic to broadly oblong or ovate, 40-150 mm long, 20-80 mm wide, L/B 1.6-2.5, entire or serrulate. *Flowers* in axillary fascicles, bisexual, actinomorphic. *Sepals* 5, erose or entire. *Petals* 4-5, yellowish green, 3.5-4.5 mm long. Disc thick and fleshy, lobed, reflexed in old flowers. *Stamens* 3, inside disc adjacent to ovary; filaments flattened at base. *Ovary*

superior, partly immersed in disc, 3-locular with 2 ovules per locule, placentation axile; stigma sessile. *Fruit* drupaceous, a, orange to red, globular, 13-23 mm diam. *Seed* 1. *Flowering*: July - Oct; fruiting: Oct - Dec. Fig. 69

From India to the Solomons and with disjunct occurrences in NE Qld, Cobourg Peninsula and Glasswater Creek in the DR, where known from a single sterile collection. Coastal monsoon thickets. The flowers are reported to have a strong unpleasant odour.

## STACKHOUSIACEAE

A small family centred in Australia with 3 genera and c. 16 species. Two genera represented in the NT with 1 in the DR. [Barker, 1984]

### STACKHOUSIA Smith

A genus of 14 species with 13 found in Australia; 3 occur in the NT but only 1 in the DR.

#### **S. intermedia** F.M.Bailey

*S. viminea* Smith, misapplied name

*Erect* annual to 80 cm high, glabrous or nearly so. Stems ribbed. Stipules minute. *Leaves* sessile, alternate, simple, linear, 10-50 mm long, 0.4-2 mm wide, L/B 25-35. *Inflorescence* an interrupted spike of small, 1-5-flowered clusters. *Flowers* bracteate, actinomorphic, bisexual. Hypanthium short. *Sepals* 5, free, c. 1 mm long. *Petals* 5, free at base, fused in middle, distally free, pale yellowish green, 3-6 mm

long. *Stamens* 5, free, 3 long, 2 short, included. *Ovary* superior, 3 carpels united along central axis; ovules 1 per carpel; style 1; stigmas 3. *Fruit* c. 2 mm long, of 3 rugose  $\pm$  globular cocci, each separating and sometimes tardily dehiscent along a median suture. *Flowering* and fruiting: Jan - May. Fig. 69

From Malesia, Micronesia to Australia where it is widespread across the subtropical and tropical regions and extending into the arid zone. Common in the DR in Eucalypt savanna on well drained soils.

## AQUIFOLIACEAE

A family of 4 genera with c. 400 species throughout the tropics and subtropics; 2 genera in Australia with only 1 in the NT. [Pedley, 1984]

### ILEX L.

A genus of c. 400 species; 3 in Australia with 1 in the NT. The genus includes the Hollies of the northern hemisphere.

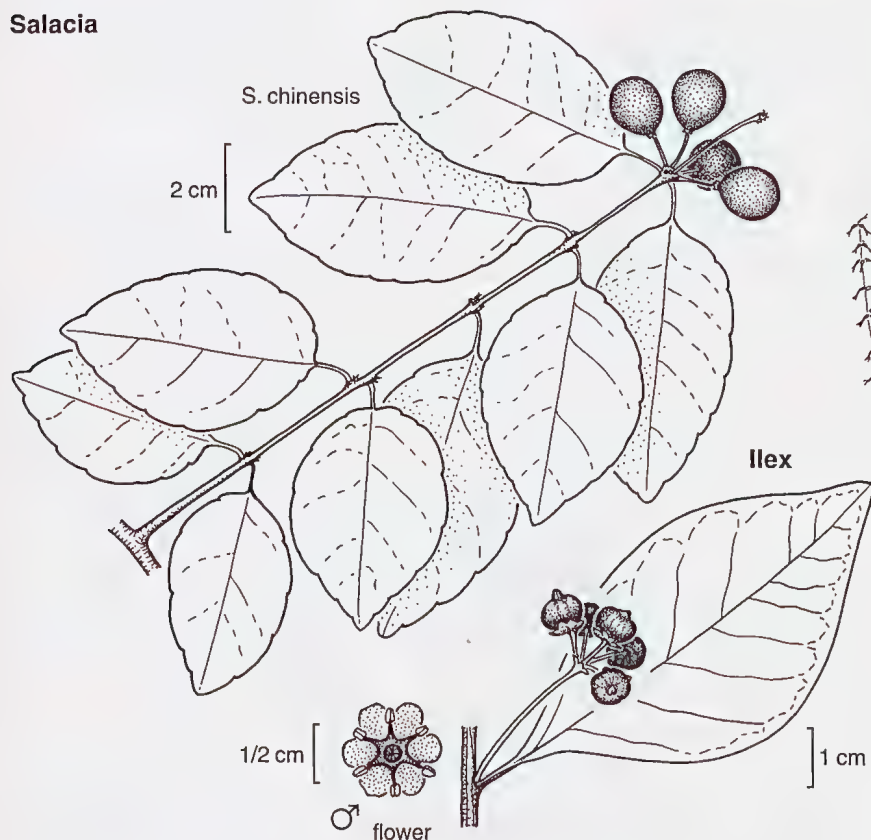
#### **I. arnhemensis** (F.Muell.) Loes.

Evergreen *tree* to 22 m. Bark smooth, pale grey. Stems and leaves glabrous. Stipules minute. *Leaves* alternate, simple; petioles 10-15 mm long; blades discolorous, entire, elliptic, rarely oblong or broadly oblanceolate, 53-140 mm long, 22-67 mm wide, L/B 2.1-5.2. *Inflorescences* axillary, cymose. Flowers dioecious, 5-8-merous, actinomorphic: males in panicles to 40 mm long; females simple to 20 mm long. *Sepals* c. 1.5 mm long, free in upper half,

ciliate. *Petals* white, oblong, 3-4 mm long, united at base into a short tube. *Stamens* as many as petals and alternating with them, subequalling petals, ciliate. *Ovary* superior, placentation apical-axile. *Fruit* white, thinly fleshy, indehiscent, depressed globular, umbonate, 4-5 mm diam. *Seeds* 12-16, erect, 1 per locule. *Flowering* and fruiting: June - Oct. Fig. 69

New Guinea and northern Australia; common in the DR in riverine forest on sandstone. Often growing in water in perennial streams.

#### **Salacia**



*I. arnhemensis*

#### **Stackhousia**



*S. intermedia*



## EUPHORBIACEAE

Trees, shrubs or herbs, often with milky latex. Stipules usually present. Leaves usually alternate, opposite or rarely whorled, simple or rarely compound. Inflorescence diverse. Flowers unisexual, monoecious or dioecious, often reduced and in *Euphorbia* grouped into a cyathium. Tepals distinct or connate near base. Stamens (1)5-many, variously arranged. Nectary disc sometimes present. Carpels (2)3(many), united into a compound ovary; style usually 1, divided into 2 or more stigmas; ovules 1-2 in each locule, pendulous, placentation axile. Fruit capsular, drupaceous or baccate.

About 300 genera and 7500 species worldwide; 65 genera in Australia with 33 genera in the NT and 24 in the DR. [Airy Shaw, 1980a,b; Webster, 1994]. Important crop plants include: *Ricinus communis* L., the Castor Oil Plant; *Hevea brasiliensis* (A.Juss.) Muell.Arg., Para Rubber, a source of natural rubber; *Manihot esculenta* Crantz, Cassava or Tapioca. Species in the genera *Acalypha*, *Codiaeum*, *Euphorbia* and *Jatropha* are used as ornamentals.

- |                                                                                                                                                                    |    |                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------|
| 1. Leaves opposite or whorled .....                                                                                                                                | 2  |                     |
| 1. Leaves alternate .....                                                                                                                                          | 3  |                     |
| 2. Leaves opposite; flowers in a cyathium; latex present .....                                                                                                     |    | <b>Euphorbia</b>    |
| 2. Leaves opposite or in whorl of 3; flowers not in a cyathium; latex absent .....                                                                                 |    | <b>Choriceras</b>   |
| 3. Leaves with minute vesicular glands on the undersurface .....                                                                                                   | 4  |                     |
| 3. Leaves lacking vesicular glands on undersurface .....                                                                                                           | 5  |                     |
| 4. Leaves peltate or cordate; lacking stellate hairs .....                                                                                                         |    | <b>Macaranga</b>    |
| 4. Leaf bases otherwise; if cordate then stellate hairs present .....                                                                                              |    | <b>Mallotus</b>     |
| 5. Leaves with flattened glands at junction of blade and petiole .....                                                                                             | 6  |                     |
| 5. Leaves lacking flattened glands at junction of blade and petiole .....                                                                                          | 7  |                     |
| 6. Inflorescence racemose; fruit a capsule .....                                                                                                                   |    | <b>Croton</b>       |
| 6. Inflorescence paniculate; fruit drupaceous .....                                                                                                                |    | <b>Endospermum</b>  |
| 7. Flowers in a cyathium; latex present .....                                                                                                                      |    | <b>Euphorbia</b>    |
| 7. Flowers solitary or in fascicles, racemes, cymes or panicles .....                                                                                              | 8  |                     |
| 8. Fruit fleshy, sometimes thinly so .....                                                                                                                         | 9  |                     |
| 8. Fruit dry .....                                                                                                                                                 | 16 |                     |
| 9. Inflorescence racemose, cymose or paniculate .....                                                                                                              | 10 |                     |
| 9. Inflorescence fasciculate or flowers solitary .....                                                                                                             | 11 |                     |
| 10. Leaves with a cluster of minute spine-like glands at the distal end of the petiole;<br>domatia absent; female inflorescence a cyme; fruit a capsule .....      |    | <b>Claoxylon</b>    |
| 10. Leaves lacking a cluster of minute spine-like glands at the distal end of the petiole;<br>domatia ± present; female inflorescence racemose; fruit fleshy ..... |    | <b>Antidesma</b>    |
| 11. Fruit >10 mm long .....                                                                                                                                        | 12 |                     |
| 11. Fruit <10 mm long, rarely to 12 mm in <i>Breynia</i> .....                                                                                                     | 13 |                     |
| 12. Fruit a globular, thinly fleshy capsule, drying hard, 3-4-locular .....                                                                                        |    | <b>Petalostigma</b> |
| 12. Fruit an indehiscent drupe, 1-locular .....                                                                                                                    |    | <b>Drypetes</b>     |
| 13. Fruit 2-locular; undersurface of leaves tomentose, tertiary venation ± parallel .....                                                                          |    | <b>Briedelia</b>    |
| 13. Fruit 3-locular; undersurface of leaves usually glabrous,<br>tertiary venation not ± parallel .....                                                            | 14 |                     |

|     |                                                                                                                                                    |                     |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| 14. | Ripe fruit white .....                                                                                                                             | <b>Flueggea</b>     |
| 14. | Ripe fruit purple-black .....                                                                                                                      | <b>15</b>           |
| 15. | Scrambling shrub; perianth of 6 free tepals .....                                                                                                  | <b>Phyllanthus</b>  |
| 15. | Erect shrub; perianth cupular .....                                                                                                                | <b>Breynia</b>      |
| 16. | Fruit >11 mm long; seeds carunculate .....                                                                                                         | <b>17</b>           |
| 16. | Fruit <11 mm long; seeds usually ecarunculate or rarely<br>( <i>Croton</i> and <i>Sebastiania</i> ) carunculate .....                              | <b>18</b>           |
| 17. | Flowers in axillary fascicles .....                                                                                                                | <b>Petalostigma</b> |
| 17. | Flowers in terminal dichasia .....                                                                                                                 | <b>Jatropha</b>     |
| 18. | Seeds lacking caruncle .....                                                                                                                       | <b>19</b>           |
| 18. | Seeds with caruncle .....                                                                                                                          | <b>29</b>           |
| 19. | Female flowers in racemes .....                                                                                                                    | <b>20</b>           |
| 19. | Female flowers in fascicles or solitary .....                                                                                                      | <b>24</b>           |
| 20. | Annual herbs; stipules gland tipped .....                                                                                                          | <b>Micrococca</b>   |
| 20. | Trees or shrubs; stipules lacking glandular tip .....                                                                                              | <b>21</b>           |
| 21. | Plants entirely glabrous .....                                                                                                                     | <b>22</b>           |
| 21. | Plants variously hairy .....                                                                                                                       | <b>23</b>           |
| 22. | Seeds enclosed in a yellow fleshy layer; latex absent;<br>tertiary veins $\pm$ parallel .....                                                      | <b>Omalanthus</b>   |
| 22. | Seeds lacking a thin yellow fleshy layer; latex present;<br>tertiary veins obscure .....                                                           | <b>Excoecaria</b>   |
| 23. | Leaf blades with a pair of basal glands .....                                                                                                      | <b>Croton</b>       |
| 23. | Leaf blades lacking basal glands but with a cluster of minute<br>spine-like glands at the distal end of the petiole .....                          | <b>Claoxylon</b>    |
| 24. | Seeds metallic blue or green .....                                                                                                                 | <b>Margaritaria</b> |
| 24. | Seeds otherwise .....                                                                                                                              | <b>25</b>           |
| 25. | Flowers 5-merous .....                                                                                                                             | <b>26</b>           |
| 25. | Flowers 3-merous .....                                                                                                                             | <b>27</b>           |
| 26. | Plants glabrous .....                                                                                                                              | <b>Poranthera</b>   |
| 26. | Plants hairy .....                                                                                                                                 | <b>Leptopus</b>     |
| 27. | Shrubs or trees; seeds red; leaves 35-140 mm long .....                                                                                            | <b>Glochidion</b>   |
| 27. | Herbs, small shrubs often with annual above ground parts or scramblers;<br>seeds never red; leaves usually <35 mm long, rarely to 55 mm long ..... | <b>28</b>           |
| 28. | Capsule depressed globose; disk glands present in either male or female flowers;<br>androphore usually absent .....                                | <b>Phyllanthus</b>  |
| 28. | Capsule ellipsoid or ovoid; disk glands absent; androphore usually present .....                                                                   | <b>Sauropus</b>     |
| 29. | Leaf blades with a pair of basal glands,<br>indumentum of stellate hairs or peltate scales, >18 mm wide .....                                      | <b>Croton</b>       |
| 29. | Leaf blades lacking basal glands, glabrous, <18 mm wide .....                                                                                      | <b>Sebastiania</b>  |

## ANTIDESMA L.

Deciduous shrubs or small trees. Stipules caducous. Leaves petiolate, alternate, entire, discolorous, shiny above, glabrescent. Domatia usually present, consisting of a cluster of hairs or web of tissue in the angles of

the main vein. Inflorescence a solitary, interrupted, axillary raceme or spike, with a persistent bract subtending each flower. Flowers dioecious, sessile to shortly pedicellate, 3-5-merous, less than 3 mm long; petals absent. Male flowers: calyx with 3-5 suborbicular lobes; disk present; stamens 2-5 arising from within the disk; anther loculi separate, borne on a thickened connective. Female flowers: calyx with 3-5 triangular lobes; styles 3-5, short, bilobed; ovary 1(2)-locular, ovules 2 per locule. Fruit drupaceous, fleshy, compressed ellipsoid, red when immature, turning dark purple to black when ripe; seeds compressed ovoid, endocarp irregularly pitted.

A genus of c. 170 species found in the Old World tropics and subtropics; c. 5 species occur in Australia, with 2 in the NT. The fruit of many species are edible (Scholefield, 1984).

- |                                                                                                       |                        |
|-------------------------------------------------------------------------------------------------------|------------------------|
| 1. Leaves usually >20 mm wide; inflorescence brown tomentose;<br>on lowland sites on deep soils ..... | <b>A. ghesaembilla</b> |
| 1. Leaves usually <20 mm wide; inflorescence glabrescent; on sandstone .....                          | <b>A. parvifolium</b>  |

### **A. ghesaembilla** Gaertn.

*Shrub* or tree to 8 m tall; bark grey to brown, fibrous, finely fissured, blaze deep pink. Young growth with brownish  $\pm$  crisped hairs, becoming glabrescent with age. Indumentum persistent on petioles and undersides of leaves. Petioles 3-9 mm long. *Leaf blades* elliptic to broadly elliptic, obovate or broadly oblanceolate, 21-104 mm long, 18-60 mm wide, L/B 1.2-2.5, base broadly cuneate to rounded, occasionally cordate, apex obtuse to slightly emarginate. *Inflorescence* brown tomentose throughout, 21-91 mm long. *Fruit* 4-6 mm long, c. 5 mm wide. *Flowering*: with the new foliage, Sept - Dec; fruiting: Dec - June. Fig. 70

In Asia from India and China to New Guinea and in northern Australia from the Kimberley to Cape York. Common in the DR. Often occurs on the margins of floodplains and watercourses, near

monsoon forest and in wetter areas in Eucalypt communities.

### **A. parvifolium** F.Muell.

*Shrub* or small *tree* 1-4 m tall, often with strongly developed short leafy lateral shoots. Young shoots shortly hairy, becoming glabrous with age. *Stipules* 1-2 mm long. *Petioles* 1-2 mm long. *Leaf blades* glossy above, typically obovate, also elliptic, 8-30 mm long, 6-20 mm wide, L/B 0.8-2, thin, base attenuate, apex rounded to emarginate. *Inflorescence* glabrescent, 20-30 mm long. *Fruit* 5-6 mm long, c. 4 mm wide. *Flowering*: Nov - Feb; fruiting: Jan - June. Fig. 70

Endemic to Australia in Qld and the NT, from Victoria R. to Cape York. In the DR known only from McMinns Bluff. On rocky slopes and in rocky gorges on sandstone.

## **BREYNIA** J.R. & G.Forst.

A genus of c. 25 species occurring from SE Asia to Australia. Two species occur in Australia, with 1 found in the NT and the DR.

### **B. cernua** (Poiret) Muell.Arg.

Evergreen *shrub* or small tree to 4 m tall; bark brown, finely fissured; all parts glabrous. *Stipules* persistent, triangular, 1-1.5 mm long. *Leaves* alternate; petioles 2.5-5 mm long; blades discolorous, elliptic or ovate but occasionally suborbicular, obovate or lanceolate, 25-95 mm long, 12-56 mm wide, L/B 1.2-2.2, base broadly cuneate, attenuate or rounded, rarely truncate, margin entire, apex obtuse to rounded, occasionally acute. *Inflorescence* axillary, fasciculate, 1-5-flowered. *Flowers* monoecious, on

pedicels to 7 mm long. *Male flowers* c. 2 mm long, with the perianth united into a flat-topped turbinate tube, the 6 short blunt inflexed lobes almost closing the apical orifice; stamens 3, united into a column; anthers 2-celled, adnate to the column, almost entirely enclosed by the perianth. *Female flowers* c. 2.5 mm long, the perianth united into a campanulate tube with 6 short blunt lobes in 2 series; ovary 3-locular with 2 ovules in each locule, thick and fleshy above the locules; styles 3, short, slightly spreading. *Fruit* a thinly fleshy berry, white when immature,



turning red then black when ripe, depressed-globular, occasionally shortly beaked or shortly stipitate, 3-6(12) mm long, 4-8(10) mm diam., perianth persisting. *Seeds* brown, c. 4 mm long, 3-sided, with a straight inner angle and curved outer side, hilum small. *Flowering* and fruiting: most months. Fig. 70

In eastern Indonesia, New Guinea, parts of

western Polynesia and widespread in northern Australia from the Kimberley to Cape York. Common in the DR. On a variety of soil types in less fire prone habitats including edges of monsoon forest, riparian forest, edges of floodplains and maritime habitats. Plants with stipitate fruit have been referred to *B. stipitata* Muell.Arg. whilst those with beaked fruit have been referred to *B. rhynchocarpa* Benth.

## BRIEDELIA Willd.

*Bridelia* Willd. orth. variant

A genus of c. 60 species occurring in Africa and Asia. Four species occur in Australia, with 1 in the NT and the DR.

### *B. tomentosa* Blume

A deciduous *shrub* or small tree to 5 m tall; branchlets with whitish lenticels. Shoots, branchlets, petioles and undersurface of leaves rusty tomentose when young, becoming glabrous with age. *Stipules* caducous, narrowly triangular, 2.5-4 mm long. *Leaves* alternate; petioles 2-5 mm long; blades discolorous, elliptic, narrowly elliptic or obovate, rarely ovate, 32-99 mm long, 15-51 mm wide, L/B 1.4-2.4(3.5), with distinct yellowish venation, tertiary nerves  $\pm$  parallel, base rounded or cuneate, apex obtuse, subacuminate or rarely emarginate. *Inflorescence* axillary, fasciculate-glomerate, with small bracts, usually with only one fruit per inflorescence maturing. *Flowers* monoecious, 5-merous, pedicels 0-1.5 mm long. *Male flowers*: calyx triangular, c. 1.3 mm long; petals triangular, c. 0.5 mm long; disk c. 1 mm diam., flattened;

stamens 5, on an androgynophore. *Female flowers*: calyx broadly triangular, c. 1.8 mm long; petals obovate or elliptic, c. 1 mm long; outer margin of the disk thickened, undulating, entire, the inner margin clasping the ovary and irregularly 5-lobed; styles 2, each with 2 lobes, c. 0.5 mm long; ovary 2-locular, 2 ovules per locule. *Fruit* a thinly fleshy black berry, 5-7 mm long, 5-6 mm diam., depressed globular to ovoid, 1 seed per locule, calyx and petals persisting. *Seeds* brown, flattened ovoid, longitudinally furrowed on the inner surface. *Flowering*: Mar - June; fruiting: Mar - Sept. Fig. 70

Throughout SE Asia, extending as far as India, Taiwan and New Guinea and in Australia from the Kimberley to Cape York. Common in the DR. Often found with monsoon forest, but also on rocky slopes, beach dunes, riparian habitats and on laterite. The fruits are edible (Levitt, 1981; Russell-Smith, 1985).

## CHORICERAS Baill.

A genus of 2 species restricted to New Guinea and northern Australia. One species occurs in the NT and DR.

### *C. tricornis* (Benth.) Airy Shaw

*Shrub* or a small tree to 5 m tall. Young shoots, pedicels and peduncles white to fulvous tomentose-sericeous. *Leaves* opposite or on the main stems 3-whorled; petioles 2-3 mm long; blades discolorous, shiny above, elliptic, obovate or ovate, 25-53 mm long, 14-26 mm wide, L/B 1.7-2.6, base cuneate or attenuate, margin crenulate-serrate with a minute mucro at the base of each lobe, apex blunt, emarginate or occasionally acute. *Flowers* monoecious, in dense axillary cymes 6-12 mm long;

perianth segments 6 in 2 series. *Male flowers*: pedicels filiform, to 5 mm long; perianth segments membranous, orbicular, the outer c. 1.2 mm long, the inner c. 1.8 mm long; stamens 6 arising from a pilose receptacle, staminal filaments c. 2 mm long. *Female flowers*: 1-3 on a short common peduncle, pedicels thickened to 4 mm long; outer perianth segments triangular-ovate, c. 2 mm long, the inner ones triangular, c. 1.5 mm long; ovary of 3(4) sericeous 2-ovuled locules; styles thickened, divaricate, recurved, c. 2 mm long. *Fruit* a capsule, depressed globular, 7-8 mm

long, c. 9 mm diam., finely tuberculate and thinly tomentose, with the persistent style bases forming a horn-like projection from the apex of each cocci. *Seeds* smooth, brown, ovoid. *Flowering*: Oct - June; fruiting: Apr - Oct. Fig. 70

Found in the northern NT, Cape York and New Guinea. In the DR on Gunn Pt and Melville Is where it grows in thickets. Usually in monsoon forest on a variety of soils as well as in riparian forest, wetter eucalypt forest and in sandstone gorges.

## CLAOXYLON Juss.

A genus of c. 80 species occurring in the Old World tropics. Three species occur in Australia, with 1 in the NT and the DR.

### *C. tenerifolium* (Baill.) F.Muell.

A shrub or small tree to 10 m tall; bark rough. Young shoots sericeous, glabrescent with age. Branchlets pale, glabrous with scattered whitish lenticels. *Leaves* alternate; petioles purplish when dry, 13-133 mm long, below junction of blade sparsely tomentose and often with 2-4 minute yellowish spine-like glands on the dorsal surface; blades discolorous, ovate, elliptic or obovate, 116-223 mm long, 62-130 mm wide, L/B 1.5-2.2, glabrescent, scaberrulous, veins turning purple when dry, base attenuate, truncate, margin crenate, with a mucro-like gland in the sinus between lobes, each mucro with a vein leading to it, apex acuminate, obtuse or acute. *Inflorescence* axillary, racemose, pubescent, male 35-170 mm long, female 22-55 mm long. *Flowers* dioecious. *Male flowers*: on filiform pedicels to 4 mm long; sepals 3, elliptic,

membranous, tomentose outside, c. 2 mm long; petals absent; stamens numerous c. 1.5 mm long; anther cells separated and erect. *Female flowers*: on thickened pedicels c. 1 mm long, sericeous throughout; calyx 3-lobed, lobes triangular, c. 1.5 mm long; hypogynous disk 2-3-lobed; ovary 3-locular, with 1 ovule per locule; styles c. 1.5 mm long, divergent, shortly connate at base. *Fruit* a purplish, thinly fleshy capsule, depressed globular, c. 5 mm long, 7 mm diam., with (2)3 1-seeded locules. *Seeds* globose, white, c. 3 mm long, ecarunculate. *Flowering*: Nov - June; fruiting: Feb - May. Fig. 70

Occurs from the Kimberley Region to the east coast of Qld as far south as Port Curtis, and also in New Guinea. Rare in the DR where known only from Melville Is. Occurs in monsoon forest, in sandstone gorges and on the coast.

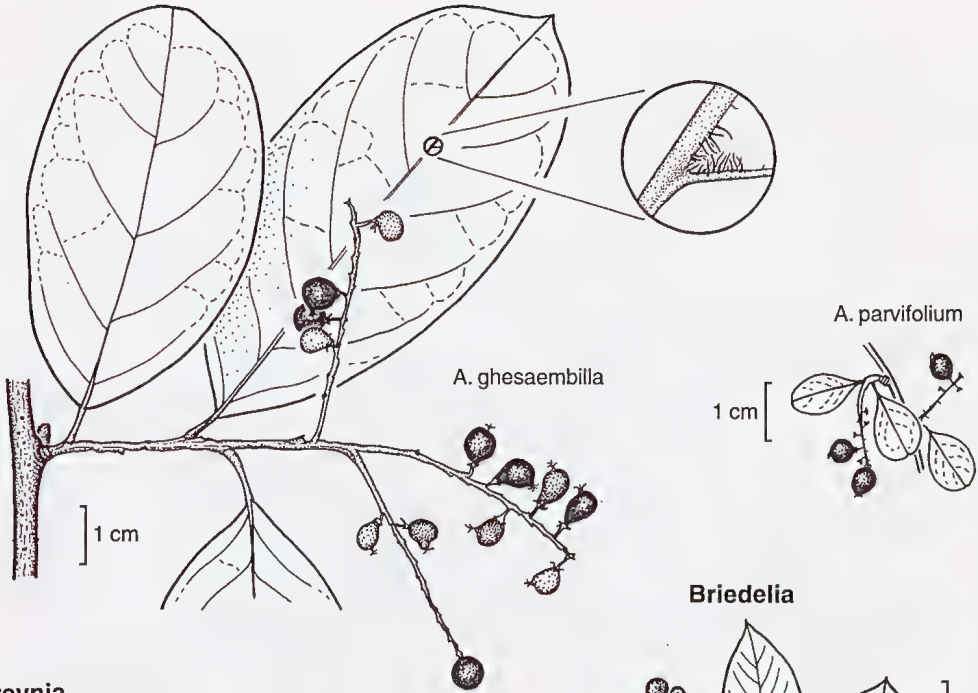
## CROTON L.

Deciduous shrubs or small trees, variously stellate hairy or with lepidote scales. Stipules minute. Leaves alternate; blades with 2 glands at base. Flowers monoecious, dioecious or a combination of both. Inflorescence racemose, usually terminal. Flowers 5-merous, males with small disk glands, stamens 5-30; females often with vestigial petals; ovary 3-locular. Fruit a capsule. Seeds ecarunculate or caruncle small.

A genus of c. 750 species found in the tropics and subtropics. In Australia there are c. 20 species, with 6 in the NT and 5 in the DR. Cultivated plants known as 'Croton' usually belong to the genus *Codiaeum* A. Juss. which is introduced to the NT. [Airy Shaw, 1980a, b; Wilmot-Dear, 1987]

- |    |                                                                                                                                  |                               |
|----|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1. | Plants with peltate scales; leaf undersurfaces silvery shiny; sepals c. 5 mm long .....                                          | <i>C. argyratus</i>           |
| 1. | Plants glabrous, stellate hairy or with stellate scales; sepals <3 mm long .....                                                 | 2                             |
| 2. | Leaves 2.2-4.5 times as long as wide, almost glabrous, base cuneate .....                                                        | <i>C. sp. aff. dockrillii</i> |
| 2. | Leaves usually <2.2 times as long as wide, often densely tomentose,<br>base rounded, truncate or cordate .....                   | 3                             |
| 3. | Leaf 5-7-nerved at base, margins often crenulate to irregularly serrulate;<br>young shoots often rusty or yellow tomentose ..... | <i>C. arnhemicus</i>          |
| 3. | Leaf 3-5-nerved at base, margins finely crenulate; young shoots hoary or green .....                                             | 4                             |

**Antidesma**



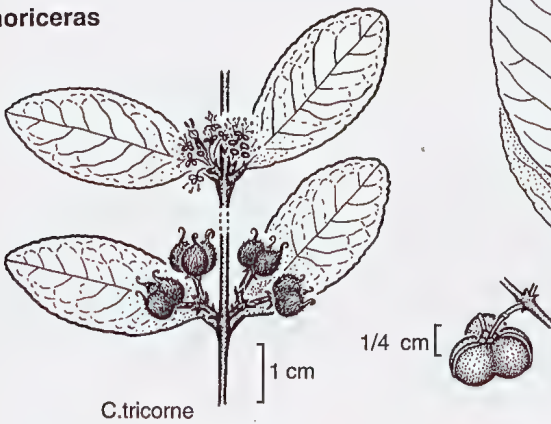
**Breynia**



**Claoxylon**



**Choriceras**





- |    |                                                                                   |                        |
|----|-----------------------------------------------------------------------------------|------------------------|
| 4. | Undersurface of expanded leaves and inflorescence tomentose; on rocky sites ..... | <b>C. tomentellus</b>  |
| 4. | Undersurface of expanded leaves and inflorescence sparsely stellate hairy .....   | <b>C. habrophyllus</b> |

### **C. argyratus** Blume

*Shrub* or small tree to 4 m, rarely 10 m. The whole plant covered to varying degrees in peltate scales. Branchlets ferruginous. Petioles 20-75 mm long, often ferruginous. *Leaf blades*, ovate or broadly lanceolate, 60-120 mm long, 50-92 mm wide, L/B 1-1.9, often glabrescent above, silvery-shiny, with fine translucent pellucid dots below, base truncate, rounded to cordate, 3-5-nerved, margins  $\pm$  entire. *Inflorescence* 20-45 mm long. *Flowers* monoecious; sepals c. 5 mm long, narrowly elliptic. *Fruit*  $\pm$  spherical, 6-7 mm long. *Seeds* mottled, c. 5 mm long. *Flowering*: Nov; fruiting: Feb - May. Fig. 71

In SE Asia as far east as the Moluccas and in Australia only known from the NT, from Darwin as far east as western Arnhem Land. Mainly in coastal deciduous vine thickets or on limestone outcrops in subcoastal situations.

### **C. arnhemicus** Muell.Arg.

A deciduous *shrub* or small tree to 5(12) m tall, with leaves turning red before falling; bark pale. Whole plant including fruit softly and densely stellate hairy, with plants from mesic habitats usually less hairy. Branchlets and young leaves often appearing rusty coloured or yellowish. Petioles 20-110 mm long. *Leaf blades* discolorous, ovate, lanceolate, broadly lanceolate, or suborbicular, 60-300 mm long, 40-280 mm wide, L/B 0.9-1.5, sparsely tomentose above, often hoary-tomentose beneath, strongly 5-7-nerved, base cordate or truncate, margin crenulate to irregularly serrulate, with small scattered  $\pm$  stipitate glands often present in the sinuses on the underside. *Inflorescence* 50-270 mm long. *Flowers* monoecious or dioecious. *Fruit* on a pedicel c. 5 mm long,  $\pm$  globular, 6-9 mm long, each of the persistent styles divided into 2 linear lobes; sepals persistent, triangular, c. 2 mm long. *Seeds* c. 5 mm long, with occasional stellate hairs. *Flowering*: Sept - Dec; fruiting: Oct - Mar. Fig. 71

Found in northern Australia from the Kimberley to Cape York. Common in the DR. In open forest and monsoon forest, on well drained soils. Medicinal uses have been reported (Russell-Smith, 1985; Smith & Wightman, 1990).

### **C. sp. aff. dockrillii** Airy Shaw

Small *tree* to 3.5 m tall. Young shoots, branchlets and petioles with adpressed stellate scales. Petioles 10-40 mm long. *Leaf blades* slightly discolorous,

elliptic-oblong to oblong, 49-150 mm long, 17-40 mm wide, L/B 2.2-4.5, glabrous above, glabrescent below, surface finely and densely pellucid punctate, base cuneate, 3-nerved, margin shallowly and regularly serrate with minute mucros on the teeth, apex acuminate to acute. *Flowers* and fruit not seen. Not illustrated.

In the DR, known only from the Mary R. in riparian vegetation, but also in central Arnhem Land.

### **C. habrophyllus** Airy Shaw

A small deciduous *tree* to 6 m tall; bark grey-brown, finely lenticelled, blaze cream with white streaks. Young shoots, branchlets and petioles with a dense stellate pubescence. Petioles 5-44 mm long. *Leaf blades* discolorous, broadly lanceolate, ovate or elliptic, 55-110 mm long, 35-60 mm wide, L/B 1.2-2.2, when fully expanded sparsely stellate hairy below and glabrous or glabrescent above, surface finely and densely pellucid punctate, base truncate or rounded, occasionally slightly cordate, 3- or indistinctly 5-nerved, margin serrate or crenulate, with a glandular umbo in the sinus of each serration, apex acuminate or acute. *Inflorescence* 40-205 mm long, sparsely stellate hairy. *Flowers* dioecious; sepals triangular to lanceolate, c. 2.5 mm long, with a tuft of hairs at the apex, persistent. *Fruit* on pedicel c. 3 mm long, depressed globular, 4-5 mm long, sparsely stellate hairy, 3(4)-locular. *Seeds* often mottled. *Flowering*: Sept - Dec; fruiting: Oct - Feb. Fig. 71

In north western Australia in coastal localities between Broome and the Gulf of Carpentaria. Common in the DR in coastal vine thickets or occasionally riparian vine thickets. Glabrous leaved forms of this species may be referred to *C. byrnesii* Airy Shaw and are found in subcoastal localities on sandstone.

### **C. tomentellus** F.Muell.

A small *tree* to 4 m tall. Bark smooth, grey. A soft, dense stellate indumentum persisting on all parts. Petioles 5-37 mm long. *Leaf blades* discolorous, 65-150 mm long, 37-90 wide, L/B 1.4-2.5, sparsely hairy above and hoary-tomentose below when fully expanded, base rounded, 3-5-nerved, margins shallowly and indistinctly dentate with a small mucro at the apex of each tooth, apex acuminate. *Inflorescence* 90-150 mm long, tomentose throughout. *Flowers* monoecious. Sepals persistent,

triangular, c. 1.5 mm long, with an apical tuft of hairs. *Fruit* on pedicel c. 3 mm long, depressed globular, c. 6 mm long, sparsely stellate-pubescent. *Flowering*: Oct - Dec; fruiting: Dec. Fig. 71

Endemic to Australia, from the Kimberley to western Arnhem Land on rocky sites. In the DR known only from monsoon thickets on granite outcrops at Mt. Bunday.

## DRYPETES Vahl

A genus of c. 200 species found throughout the tropics and also in subtropical parts of east Asia, southern Africa and eastern Australia. Two species occur in Australia, 1 of which is found in the NT and the DR.

### **D. deplanchei** (Brong. & Gris) Merr.

*D. lasiogyna* (F.Muell.) Pax & Hoffm.

A deciduous *tree* to 8(15) m tall with smooth blotched grey and white bark; blaze creamy yellow. Young shoots, branchlets, petioles, and leaf bases tomentose. *Stipules* deciduous, triangular, <1 mm long. Juvenile leaves coarsely dentate with spinose teeth to 3 mm long. Adult *leaves* alternate, stiffly coriaceous; petioles 5-15 mm long; blades glossy above, ovate, occasionally elliptic or orbicular, 33-130 mm long, 18-62 mm wide, L/B 1.1-2.5, glabrescent, with fine reticulate venation, base rounded, cordate or attenuate, often unequal, margin entire, apex rounded, occasionally acute or emarginate. *Inflorescence* a short axillary or cauliflorous fascicle, tomentose throughout. *Flowers* dioecious; sepals 4(5), free, suborbicular, tomentose outside. *Male flowers*: c. 3.5 mm long; stamens c. 8,

filament c. 1 mm, arising with villous hairs from between the lobes of the sinuate-margined disk. *Female flowers*: sepals c. 3 mm long; disk annular, margin 4-lobed to sinuate; ovary 1-locular with 2 ovules, pubescent; styles very short; stigmas flabellate or occasionally bifid with linear lobes, reflexed and adpressed to the apex of the ovary. *Fruit* a yellow to red drupe, compressed ellipsoid or obovoid, 12-18 mm long, 8-11 mm diam., sparsely pubescent. *Seed* 1. *Flowering*: Sept - Nov; fruiting: Dec - Aug. Fig. 71

Found across northern Australia from the Kimberley to the east coast as far south as northern NSW; also in New Guinea. Common in the DR. Grows in monsoon forest in a variety of habitats, rarely in open forest. The fruit are edible and the timber is used by Aborigines for implements (Levitt, 1981; Russell-Smith, 1985).

## ENDOSPERMUM Benth.

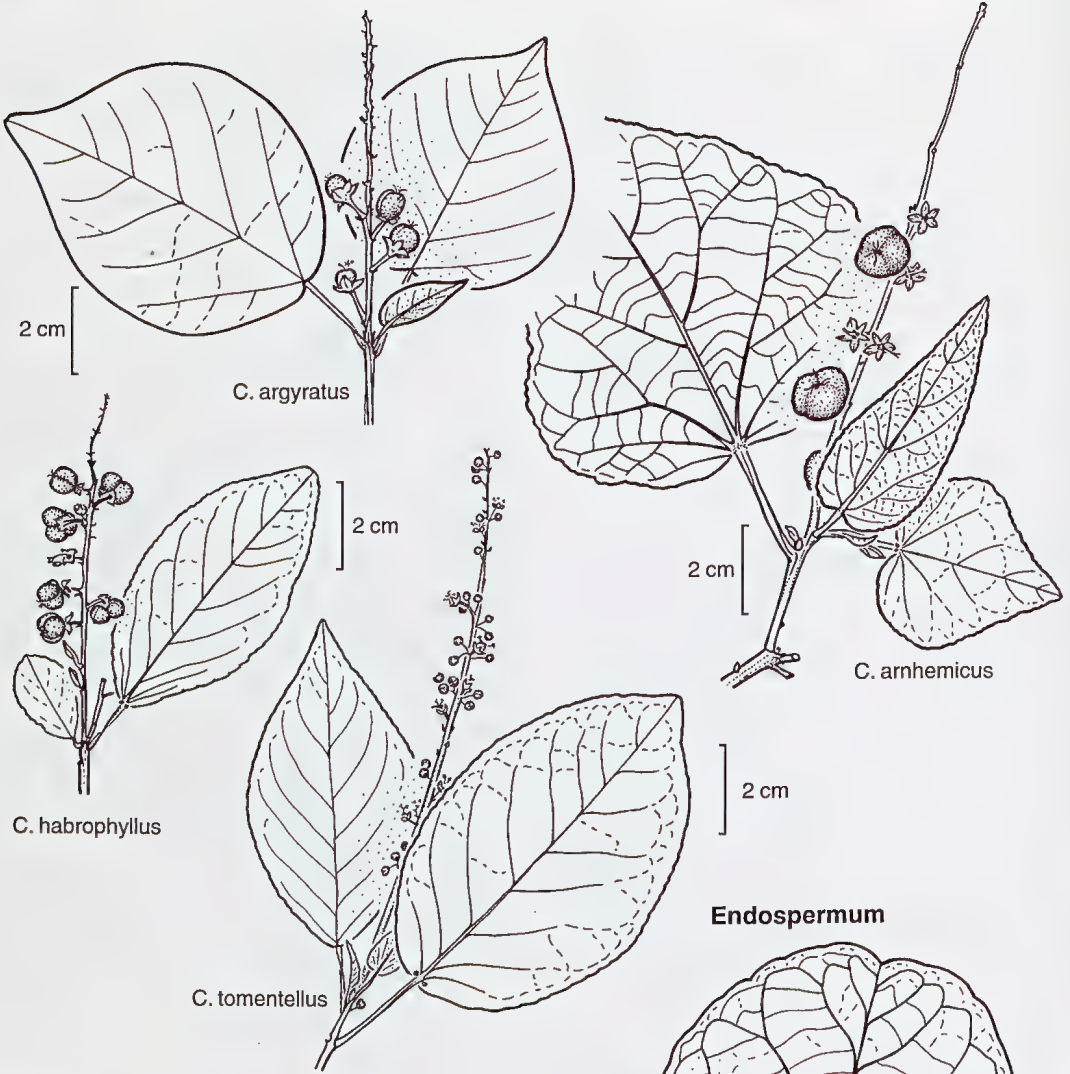
A genus of 12 species from southern China through SE Asia, New Guinea to Polynesia and Fiji. Two species occur in Australia, with 1 in the NT and the DR. [Airy Shaw, 1980a,b; Schaeffer, 1971]

### **E. medullosum** L.S.Sm.

*Tree* to 35 m, with pale yellow to white smooth bark. Branchlets stout. Young shoots, branchlets, petioles and leaf undersurface pubescent with short dense stellate hairs. *Stipules* caducous, c. 2.5 mm long, triangular. *Leaves* spirally arranged. Juvenile leaves peltate; petioles c. 315 mm long; blades c. 313 mm long, 257 mm wide, sparsely tomentose with simple hairs on both surfaces. Adult leaves with petioles to 150 mm long; blades usually non-peltate, occasionally peltate, discoloured, ovate to orbicular, 65-165 mm long, 60-146 mm wide, L/B c. 1, 5-7-nerved, with 2 yellow-brown flattened glands at junction with petiole, margin entire with several small glands, apex

rounded to shortly acuminate. *Inflorescence* of axillary panicles, 100-190 mm long, with racemose branches to 40 mm long, stellate tomentose throughout. Bracts and bracteoles 1.5-2 mm long, triangular. *Flowers* dioecious, bisexual flowers rarely present, calyx indistinctly 4-lobed, petals absent. *Male flowers*: calyx c. 1.5 mm long; stamens 5-7, spirally arranged on an androphore c. 1.7 mm long, anthers 4-valved. *Female flowers*: pedicels 3-4 mm long; calyx c. 1 mm long; ovary tomentose, 1-locular, stigma sessile, discoid, lobed, c. 1 mm wide. *Bisexual flowers*: stamens 5 on short filaments. *Fruits* drupaceous, white, thinly fleshy, ellipsoid, c. 9 mm long, 7 mm diam., stigma, calyx and (in bisexual

**Croton**



**Endospermum**

**Drypetes**

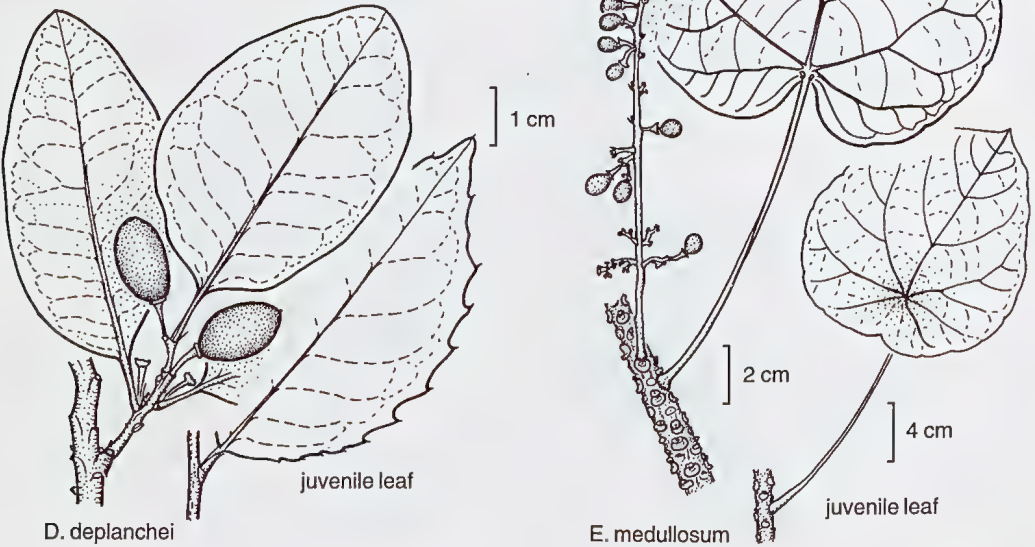


**Fig. 71**



flowers) anthers persisting. *Seeds* ovoid, c. 7 mm long.  
*Flowering*: not known; fruiting: Oct - Nov. Fig. 71

Found from New Guinea to the Solomon Islands,

and in Cape York and the DR in northern Australia.  
Uncommon in the DR where known from Melville  
Is., Channel Point, Reynolds R. and Black Jungle  
where it grows in wet rainforests.

EUPHORBIA L.

B.G. Thomson (partly)

Trees, shrubs or herbs with milky latex. Stipules minute or absent. Cauline leaves opposite, alternate or whorled, usually simple. Floral leaves opposite. Flowers much reduced, aggregated into a specialised inflorescence called a cyathium which consists of 1 female flower surrounded by several smaller male flowers, all enclosed in an involucre of connate bracts; nectary glands alternate with bracts and often with petaloid appendages. Male flowers: reduced to a single stamen. Female flowers: naked, pedicellate; ovary 3-locular, ovules 1 per locule; styles 3, shortly connate at base, each 2-lobed. Fruit a schizocarp, splitting into 3 mericarps. Seeds with or without a caruncle.

A genus of c. 2000 species worldwide; c. 57 species in Australia with c. 31 in the NT and 10 in the DR. The genus is treated here in the broad sense and includes species which may otherwise be included in *Chamaesyce* S.F.Gray and *Poinsettia* R.Grah.

KEY BASED ON VEGETATIVE CHARACTERS

|    |                                                      |                         |
|----|------------------------------------------------------|-------------------------|
| 1. | Leaves alternate .....                               | 9                       |
| 1. | Leaves opposite .....                                | 2                       |
| 2. | Leaves mostly linear-oblong .....                    | <i>E. vachellii</i>     |
| 2. | Leaves otherwise .....                               | 3                       |
| 3. | Plants herbaceous, usually annual .....              | 4                       |
| 3. | Plants suffrutescent, roots at least perennial ..... | 7                       |
| 4. | Leaves glabrous, blades pale below .....             | <i>E. armstrongiana</i> |
| 4. | Leaves puberulous to glabrescent .....               | 5                       |
| 5. | Leaf blades <8 mm long .....                         | <i>E. chamaesyce</i>    |
| 5. | Leaf blades >8 mm long .....                         | 6                       |
| 6. | Leaf blades 9-14 mm long .....                       | <i>E. schultzei</i>     |
| 6. | Leaf blades 13-35 mm long .....                      | <i>E. hirta</i>         |
| 7. | Plant glabrous .....                                 | 8                       |
| 7. | Plant hairy .....                                    | <i>E. schizolepis</i>   |
| 8. | Aerial stems annual, prostrate; open forest .....    | <i>E. muelleri</i>      |
| 8. | Aerial stems perennial, erect; beach dunes .....     | <i>E. atoto</i>         |
| 9. | Larger leaves lobed; floral leaves red at base ..... | <i>E. cyathophora</i>   |
| 9. | All leaves entire; floral leaves usually green ..... | <i>E. heterophylla</i>  |

KEY BASED ON REPRODUCTIVE CHARACTERS

|    |                                                                                                                                  |   |
|----|----------------------------------------------------------------------------------------------------------------------------------|---|
| 1. | Leaves alternate or spirally arranged (occasionally absent), those subtending the inflorescence opposite; cyathial gland 1 ..... | 2 |
| 1. | Leaves all opposite; cyathial glands 4 .....                                                                                     | 3 |

- |     |                                                                                                                |                         |
|-----|----------------------------------------------------------------------------------------------------------------|-------------------------|
| 2.  | Leaves subtending the inflorescence with pink or red basal centres .....                                       | <b>E. cyathophora</b>   |
| 2.  | Leaves subtending the inflorescence green .....                                                                | <b>E. heterophylla</b>  |
| 3.  | Seed coat smooth .....                                                                                         | <b>4</b>                |
| 3.  | Seed coat rugose, grooved or tuberculate .....                                                                 | <b>5</b>                |
| 4.  | Capsules 3-4 mm long, 4-4.5 mm diam.; seeds 1.7-2 mm long,<br>1.6-2 mm diam. ....                              | <b>E. atoto</b>         |
| 4.  | Capsules 1.4-3 mm long, 1.8-3.6 mm diam.; seeds 1.1-1.8 mm long,<br>0.8-1.6 mm diam. ....                      | <b>E. muelleri</b>      |
| 5.  | Seed facets with 3-5 deep transverse grooves .....                                                             | <b>E. armstrongiana</b> |
| 5.  | Seed facets rugose, tuberculate or shallowly transversely grooved .....                                        | <b>6</b>                |
| 6.  | Seeds 2.7-3.2 mm long, 1.8-2.3 mm diam; coat with large,<br>flat-topped tubercles .....                        | <b>E. schizolepis</b>   |
| 6.  | Seeds smaller than above; coat rugose .....                                                                    | <b>7</b>                |
| 7.  | Cyathia in dense, ±leafless clusters .....                                                                     | <b>8</b>                |
| 7.  | Cyathia in loose cymes or solitary in upper axils; subtending leaves not reduced .....                         | <b>9</b>                |
| 8.  | Stems with long yellow hairs to 1.5 mm long;<br>capsules 0.9-1.2 mm long, 1.2-1.5 mm diam. ....                | <b>E. hirta</b>         |
| 8.  | Stems without yellow hairs; capsules 1.6-2.2 mm long, 1.8-2.3 mm diam. ....                                    | <b>E. vachellii</b>     |
| 9.  | Gynophore glabrous .....                                                                                       | <b>E. vachellii</b>     |
| 9.  | Gynophore hairy .....                                                                                          | <b>10</b>               |
| 10. | Capsules with short white hairs along the keels or glabrous,<br>smooth, 1.3-1.6 mm long, 1.3-1.5 mm diam. .... | <b>E. chamaesyce</b>    |
| 10. | Capsules puberulous, often papillose, 2.3-2.8 mm long, 3-3.5 mm diam. ....                                     | <b>E. schultzei</b>     |

### **E. armstrongiana** Boiss.

Decumbent or erect annual *herb* to 30 cm tall. Stems glabrous or thinly pilose with erect or spreading hairs to 0.7 mm long. Stipules triangular, 0.2-0.7 mm long, margins lacerate. Petioles 0.7-2 mm long. *Leaf blades* orbicular to elliptic, 7-18 mm long, 3-12 mm wide, glabrous, margins entire, apex obtuse, often with a small mucro, asymmetric at base. *Cyathia* in leafy, dichotomously branched cymes or small terminal clusters, 1.2-3 mm long, 1-1.4 mm wide, glabrous. Glands 4, orbicular to oblong, flat to concave, c. 0.6 mm long, 0.3 mm wide. *Gland appendages* creamy-white to faint pink, entire, c. 0.2 mm long, 0.7-0.9 mm wide. Gynophore 1.4-2.3 mm long, glabrous. *Capsule* 2.3-2.6 mm long, 2.3-3 mm wide, glabrous. Styles c. 0.4 mm long, glabrous. *Seeds* light brown or creamy brown, tetragonous, ovoid, 1.5-1.9 mm long, 0.9-1.2 mm wide, the facets with 3-5 deep transverse grooves. *Flowering* and fruiting: Mar - May. Fig. 72

Endemic to the NT. On Cobourg Peninsula, in Kakadu NP and the DR as far south as Pine Creek. Usually on sandy soil or rocks.

### **E. atoto** Forst.

Erect or decumbent perennial *subshrub* to 40 cm tall, glabrous, usually glaucous and reddish on foliage. Stipules broad triangular, 1-2.3 mm long, margins finely lacerate. Petioles 0.5-1.5 mm long. *Leaf blades* elliptic to ovate, 12-30 mm long, 7-15 mm wide, margins entire, apex obtuse or acute. *Cyathia* in leafy, dichotomously branched cymes or small, terminal or axillary clusters, 1.6-2.3 mm long, 1.5-2 mm wide. Glands 4, oblong, flat or concave, 0.5-0.8 mm long, 0.2-0.4 mm wide. *Gland appendages* white or pink, entire or dentate, 0.1-0.3 mm long, 0.8-1.2 mm wide. Gynophore 3.5-5 mm long. *Capsule* 3-4 mm long, 4-4.5 mm wide. Styles 0.6-1.1 mm long. *Seeds* light brown or cream, ± globular, 1.7-2 mm long, 1.6-2 mm wide, smooth. *Flowering* and fruiting: most months. Fig. 72

Tropics of the Old World from India to Polynesia including northern Australia. Widespread in the Top End on coastal dunes.

### **\*E. chamaesyce** L.

*Euphorbia prostrata* Ait.

Prostrate annual *herb*. Indumentum of white hairs

to 0.2 mm long or glabrescent. Stipules narrow, subulate or divided into filiform segments, 0.3-0.5 mm long, often with white, acicular hairs. Petioles 0.5-0.9 mm long. *Leaf blades* elliptic, obovate or ovate, 3-7 mm long, 1.5-3.5 mm wide, margins entire or serrate in upper half or along adaxial edge, apex obtuse. *Cyathia* axillary and scattered or occasionally in the upper parts only, 0.5-0.8 mm long, 0.4-0.6 mm wide. Glands 4, orbicular to oblong, flat or concave, 0.1-0.2 mm long, c. 0.1 mm wide. *Gland appendages* red or purple, absent or occasionally vestigial, entire. Gynophore 0.7-1.5 mm long, pubescent. *Capsule* 1.3-1.6 mm long, 1.3-1.5 mm wide, glabrous or puberulous along the keels. Styles c. 0.2 mm long, glabrous. *Seeds* brown or creamy brown, tetraquetrous, narrow ovoid, 1.2-1.4 mm long, 0.6-0.9 mm wide, transversely rugose. Fig. 72

A weed in Qld and the NT; in the DR known only from Howard Springs.

**\*E. cyathophora** J.A.Murray

Erect annual *herb* to 1 m tall. Stems with scattered hairs. Stipules minute or absent. Leaves alternate, those below the inflorescence opposite, usually pink or red with green tips. Petioles 5-55 mm long. *Leaf blades* elliptic to obovate or pandurate, 20-110 mm long, 10-60 mm wide, upper surface glabrous, lower surface glabrous or puberulous, margins entire or serrate, apex acute. *Cyathia* in terminal clusters, 2-3 mm long, 1.5-2 mm wide, glabrous. Gland 1, orbicular, c. 1 mm diam. *Gland appendages* absent. Gynophore c. 3 mm long. *Capsules* 3-4 mm long, 5-6 mm wide, glabrous or puberulous. Styles 1-1.4 mm long, glabrous. *Seeds* brown or grey, ovoid or narrow ovoid, 2-2.8 mm long, 2-2.6 mm wide, tuberculate. *Flowering* and fruiting: most months. Fig. 72

**Dwarf Poinsettia**

Native to central America. Widely cultivated in the tropics and often naturalized. In eastern Australia widespread in coastal parts of the tropics and subtropics. In the Top End known from Nhulunbuy, Alyangula and Darwin; on disturbed sites around towns. Rare in the DR.

**\*E. heterophylla** L.

Erect annual *herb* to 1.5 m tall. Stems often with scattered hairs. Stipules minute or absent. Leaves alternate, those below the inflorescence opposite. Petioles 5-40 mm long. *Leaf blades* elliptic to obovate or pandurate, 25-120 mm long, 5-50 mm wide, upper surface glabrous, lower surface glabrous or puberulous, margins entire or slightly serrate, apex acute. *Cyathia* in terminal clusters, 2-2.5 mm long

1.5-2.2 mm wide, glabrous. Gland 1, orbicular, c. 1 mm diam. *Gland appendages* absent. Gynophore c. 3 mm long. *Capsules* 3.5-4 mm long, 5-6 mm wide, glabrous. Styles 0.9-1.5 mm long, glabrous. *Seeds* dark brown or grey, broad, tetragonous, c. 3 mm long, 2-2.5 mm wide, tuberculate. *Flowering* and fruiting: most months. Fig. 72

Native of tropical America but now widely naturalized. In north and eastern Australia, widespread in tropical and subtropical coastal regions. Common in the Top End and the DR on disturbed sites.

**\*E. hirta** L.

*Chamaesyce hirta* (L.) Millsp.

Decumbent or erect annual *herb* to 35 cm tall. Stems puberulous and commonly hispid with yellow hairs to 1.5 mm long. Stipules narrow subulate, 1-2.5 mm long, often divided into filiform segments. Petioles 1.5-3 mm long. *Leaf blades* often reddish, elliptic to obovate, 13-35 mm long, 9-15 mm wide, upper surface glabrous or puberulous, lower surface puberulous, margins serrate in upper half and on adaxial edge, apex obtuse or acute. *Cyathia* in dense, leafless clusters on reduced lateral branchlets, 0.5-0.8 mm long; 0.5-0.7 mm wide, puberulous. Glands 4, orbicular or oblong, flat, c. 0.1 mm long, 0.1-0.2 mm wide. *Gland appendages* white to pink, absent or minute, entire or dentate, c. 0.1 mm long, 0.1 mm wide. Gynophore 0.5-0.9 mm long, glabrous. *Capsule* 0.9-1.2 mm long, 1.2-1.5 mm wide, puberulous or glabrescent. Styles 0.1-0.3 mm long, glabrous. *Seeds* brown or creamy brown, tetraquetrous, ovoid, 0.6-0.8 mm long, 0.4-0.5 mm wide, rugose. *Flowering* and fruiting: most months. Fig. 72

**Asthma Plant**

A native of central America, now naturalized throughout the tropics. Widespread in tropical and subtropical Australia in coastal and inland areas. Common in the DR on disturbed sites. The white latex is used by Aboriginal people for medicinal purposes (Wightman *et al.*, 1992; Smith *et al.*, 1993). At one time widely used in Australia for the relief of asthma and bronchitis (Everist, 1979).

**E. muelleri** Boiss.

Prostrate perennial *herb*, producing foliage annually from a perennial rootstock. Stems glabrous or puberulous. Stipules broad-triangular, 0.2-0.3 mm long, often thick with broad purplish margin. Petioles 0.4-1.5 mm long. *Leaf blades* broad obovate to orbicular, 4-24 mm long, 4-18 mm wide, glabrous or puberulous below, margins entire, apex obtuse, often retuse. *Cyathia* axillary, scattered or in upper



# Euphorbia

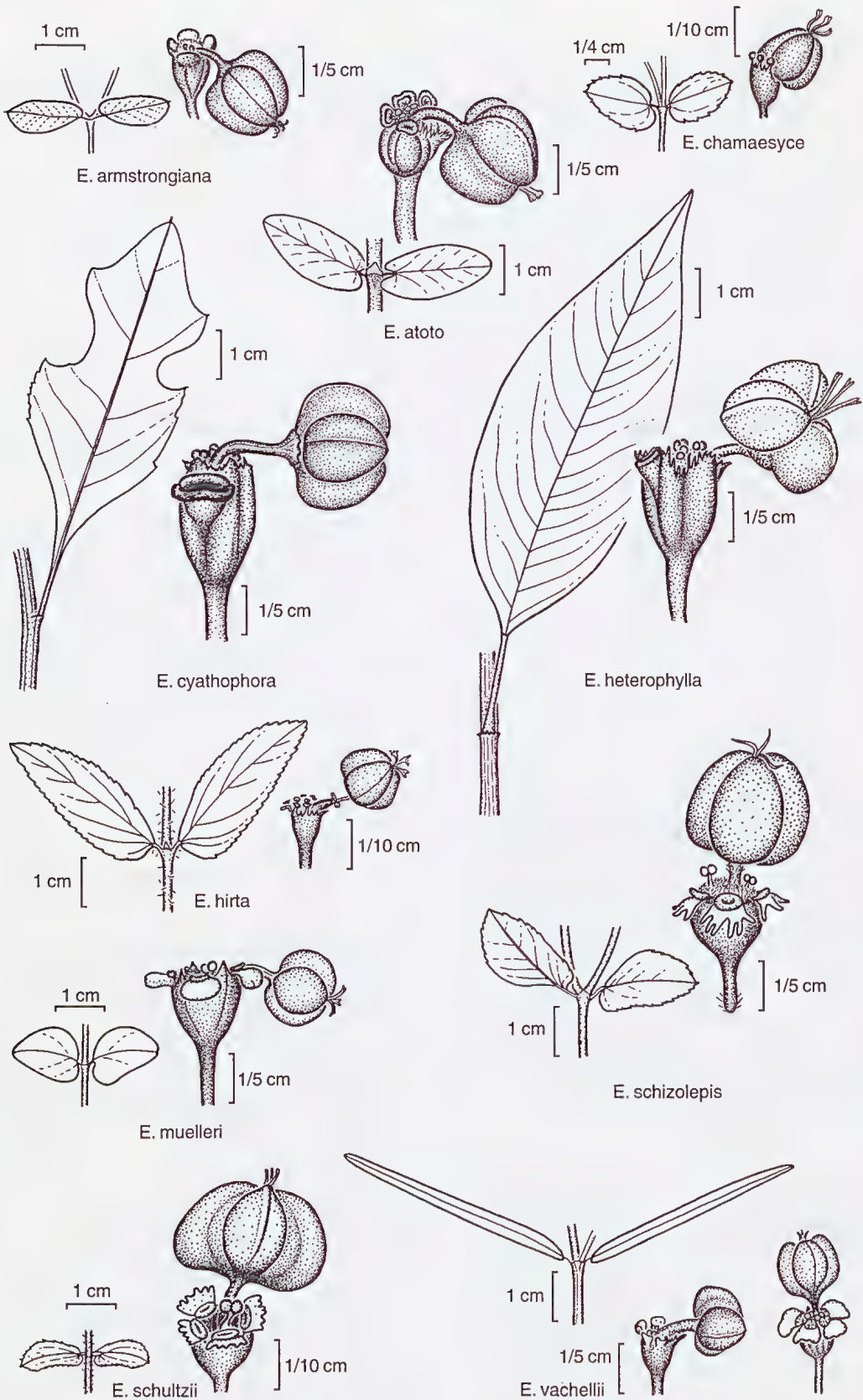


Fig. 72

parts only, 1.8-2.5 mm long, 1.5-2 mm wide, glabrous or puberulous. Glands 4, oblong, flat or concave, the inner rim often folded to the outer edge, 0.7-1.1 mm long, 0.2-0.4 mm wide. *Gland appendages* white, entire or dentate, 0.7-1.2 mm long, 1.5-2 mm wide. Gynophore 4-6 mm long, pubescent. *Capsule* 2-3 mm long, 3-3.6 mm wide, glabrous. Styles 0.3-0.5 mm long, glabrous. *Seeds* brown or creamy brown, trigonous to rounded, ovoid to orbicular, 1.3-1.8 mm long, 1.2-1.6 mm wide, smooth. *Flowering*: June - Nov; *fruiting*: Apr. Fig. 72

Apparently endemic to the Top End; in the DR, Kakadu and western Arnhem Land. Relatively common in the DR in Eucalypt savanna. Flowers in the late dry season, often on new growth after fire.

**E. schizolepis** F.Muell. ex Boiss.

Decumbent or erect perennial *subshrub* 0.6(1) m tall with hispid or pilose indumentum, occasionally glabrescent. Stipules narrow subulate or triangular, often divided into filiform segments, 0.5-1.5 mm long, margins lacinate. Petioles 1-3 mm long. *Leaf blades* elliptic to ovate, 11-20 mm long, 8-15 mm wide, margins entire or serrate in upper half and on the adaxial edge, apex acute or rarely obtuse. *Cyathia* axillary and scattered or occasionally in upper parts only, 2-3 mm long, 2-3 mm wide. Glands 4, oblong, flat or concave, 0.8-1.4 mm long, 0.4-0.6 mm wide. *Gland appendages* creamy white to faint pink, lacinate, 1-2.5 mm long, 1-3 mm wide, lower surface often pubescent. Gynophore pubescent. *Capsule* 4-6 mm long, 4.5-6.5 mm wide. Styles 1.5-2 mm long, puberulous or with minute, scattered hairs. *Seeds* dark to light brown, tetragonous, ovoid to rounded, 2.7-3.2 mm long, 1.8-2.3 mm wide, with large, flat-topped tubercles, mucilage coat often obscuring features. *Flowering* and *fruiting*: Jan - June. Fig. 72

Australian endemic; in the Kimberley, VRD and the Top End. Rare in the DR, growing in Eucalypt savanna.

**E. schultzei** Benth.

Erect, decumbent or prostrate annual *herb* to 30 cm tall, often suffused purple. Upper leaf surfaces often glabrous, otherwise whole plant with puberulous indumentum of short, curved or straight acicular hairs to 0.2 mm long. Stipules narrow subulate, often

divided, 0.4-0.8 mm long. Petioles 0.5-1 mm long. *Leaf blades* elliptic, or obovate, strongly oblique, 9-14 mm long, 4-7 mm wide, margins deeply serrate (often only in the upper half), apex obtuse to acute. *Cyathia* axillary, scattered or in upper parts only, 0.9-1.3 mm long and wide. Glands 4, oblong, concave, the inner rim often folded to the outer edge, 0.5-0.7 mm long, c. 0.3 mm wide. *Gland appendages* pink or red, denticulate, 0.3-0.5 mm long, 0.5-0.8 mm wide. Gynophore 1-1.5 mm long. *Capsule* 2.3-2.8 mm long, 3-3.5 mm wide, tuberculate, puberulous. Styles c. 0.3 mm long, glabrous. *Seeds* brown or creamy brown, tetragonous, ovoid, 1.1-1.4 mm long, 0.7-0.9 mm wide, rugose. *Flowering* and *fruiting*: Dec - June. Fig. 72

Australian endemic, widespread in northern Australia. Common in the DR in savanna and on disturbed sites.

**E. vachellii** Hook. & Arn.

*Chamaesyce vachellii* (Hook. & Arn.) Hara; *Euphorbia serrulata* Reinw.

Erect or decumbent annual *herb* or perennial to 60 cm tall. Stems glabrous or hispid to puberulous. Stipules narrow subulate, often divided in filiform segments, 0.4-1.3 mm long, margins lacerate and often with short hairs. Petioles 0.5-2.5 mm long. *Leaf blades* linear, linear-oblong to elliptic, 10-65 mm long, 1.5-16 mm wide, glabrous or hispid, margins entire or serrate, apex obtuse or acute. *Cyathia* in leafy or leafless clusters, lateral or terminal, 0.8-1.5 mm long, 0.7-1.5 mm wide, glabrous. Glands 4, orbicular or oblong, flat or slightly concave, 0.1-0.5 mm long, 0.1-0.6 mm wide. *Gland appendages* white, entire, 0.1-1.7 mm long, 0.1-2.5 mm wide. Gynophore 1-3 mm long, glabrous. *Capsule* 1.6-2.2 mm long, 1.8-2.5 mm wide, glabrous or puberulous. Styles 0.2-0.7 mm long, glabrous. *Seeds* dark brown or creamy brown, tetragonous, ovoid, 1.1-1.5 mm long, 0.7-1.3 mm wide, rugose. *Flowering* and *fruiting*: most months. Fig. 72

From south China through eastern Malesia to tropical Australia where it is widespread. In the NT as far south as Elliott. Occurs in savanna, coastal dunes and drier parts of coastal floodplains. Specimens from inland areas are mostly annual, those of coastal dunes perennial and rhizomatous. The taxon described here includes *E. mitchelliana* Boiss. The application of these names needs resolving.

## EXCOECARIA L.

Small trees or shrubs with milky sap. Glabrous. Stipules minute. Leaves alternate, often on short lateral shoots; petioles grooved above; blades slightly succulent, with a pair of glands toward the base. Inflorescence

terminal or axillary spikes or racemes. Flowers dioecious, 2-3-merous. Male flowers with minute perianth; stamens 2 or 3, anther 2-locular, the locules back to back; rudimentary female parts and disk lacking. Female flowers in shorter racemes, perianth more distinctly lobed than in male flowers; ovary 2-3-locular, with 1 ovule per locule; styles linear. Capsules dehiscent with 3 2-valved cocci. Seeds ecarunculate.

A genus of c. 40 species occurring in tropical Africa and Asia. Four species in Australia, with 3 in the NT. Two species are known from the DR but all 3 species are treated here. [Wightman, 1989] The caustic latex of all species is harmful, especially to the eyes. Some species have been referred to as "Blind Your Eyes" (Everist, 1979).

- |                                                            |                      |
|------------------------------------------------------------|----------------------|
| 1. Leaves usually < 20 mm wide .....                       | <b>E. parvifolia</b> |
| 1. Leaves usually > 20 mm wide .....                       | <b>2</b>             |
| 2. Leaf margins crenate, petiole usually >18 mm long ..... | <b>E. agallocha</b>  |
| 2. Leaf margins entire, petiole usually <17 mm long .....  | <b>E. ovalis</b>     |

### **E. agallocha L.**

A small semideciduous *tree* to 8(15) m tall with 1 to several trunks. Bark pale, smooth, lenticelled. Petioles 15-40 mm long, grooved above. *Leaf blades* discolorous, ovate, obovate or elliptic, 44-115(157) mm long, 26-60(82) mm wide, L/B 1.4-2, base rounded to cuneate, margin crenate, apex acuminate or rounded, often emarginate. *Male inflorescence* 15-115 mm long. *Capsules* 5-8 mm long. *Seeds* mottled, globular, c. 5 mm diam. *Flowering*: Oct - Feb; fruiting: Dec - Mar. Fig. 73

Distributed through Asia as far as southern India, Taiwan and the Pacific. In Australia along the coast of Qld and NSW, and in the eastern NT. Not recorded in the DR. A mangrove species occurring on sandy substrates in areas receiving some freshwater seepage.

### **E. ovalis Endl.**

Deciduous *tree* with 1 to several stems growing to 5 m tall. *Stipules* caducous, triangular, c. 1 mm long. Petioles 10-22 mm long. *Leaf blades* discolorous, elliptic or obovate, 40-87 mm long, 20-51 mm wide, L/B 1.3-2, base cuneate or rounded, margin entire or obscurely crenulate, apex rounded, often emarginate.

*Male inflorescence* 16-40 mm long; female to 30 mm long. *Capsules* 5-10 mm long. *Seeds* brown, spherical, c. 4.5 mm long. *Flowering*: Oct - Dec; fruiting: Dec - Feb. Fig. 73

Endemic to northern Australia. Common in the DR. A mangrove, growing on the landward margins of communities, occasionally above high tide mark.

### **E. parvifolia Muell.Arg.**

A semideciduous *tree* to 7 m tall. Bark dark grey, fissured. *Leaves* clustered on short lateral shoots; petioles 1-8 mm long; blades oblanceolate, obovate or narrowly elliptical, 15-47 mm long, 4-22 mm wide, L/B (1.5)3-6.4, sometimes purplish above, base cuneate or attenuate, margin entire, apex obtuse, occasionally slightly emarginate. *Male inflorescence* c. 10 mm long. *Capsules* 6-7 mm long. *Seeds* pale brown, smooth, obovoid, c. 5 mm long. *Flowering*: early wet season; fruiting: Jan - Apr. Fig. 73

**Gutta Percha**

Endemic to northern Australia. In the DR known from the Daly River area. Usually growing on seasonally waterlogged flats with clay soil, occasionally on semi-saline areas. This species has medicinal uses (Smith *et al.*, 1993) and the aromatic wood has potential for use as a veneer.

## **FLUEGGEA Willd.**

A genus of c. 14 tropical species occurring primarily in the Old World. Two species occur in Australia, with 1 in the NT and the DR. [Webster, 1984]

### **F. virosa (Roxb. ex Willd.) Voigt subsp. *melanthesoides* (F.Muell.) Webster**

*Securinega melanthesoides* (F.Muell.) Airy Shaw

*Shrub* to 4 m tall. Glabrous, occasionally slightly glaucous. *Stipules* persistent, triangular, c. 2 mm long. *Leaves* alternate; petioles 3.5-13 mm long; blades



discolorous, usually elliptic, ovate, obovate, or broadly elliptic, 26-125 mm long, 15-63 mm wide, L/B 1.4-2.2, with fine reticulate venation prominent below, base cuneate or attenuate, margin entire, apex acute, rounded or shortly acuminate. *Inflorescence* a many-flowered axillary fascicle. *Flowers* dioecious, white, scented; sepals 5, free, 1-1.2 mm long, suborbicular, the outer 2 shorter than the inner 3. *Male flowers*: pedicels filiform, to 3 mm long; stamens 5, filaments c. 2 mm long, alternating with 5 glands; pistillode present with style 2- or 3-fid, c. 1 mm long, lacking an ovary; anthers 2-celled, opening longitudinally by 2 valves. *Female flowers*: pedicels

to 3 mm long; disk flattened with an irregular margin; ovary with 3 locules each containing 2 ovules; styles 3, recurved bifid for c. half their length. *Fruit* fleshy, white, depressed globular, c. 3.5 mm long, c. 5 mm diam. *Seeds* 6, pale, shiny. *Flowering*: Nov - June; fruiting: Jan - July. Fig. 73

Distributed across northern Australia, Malesia, tropical Africa, China and Japan. Common in the DR. Often in monsoon forest, in riparian communities, floodplain margins, rocky slopes and beach dunes. Fruits are edible (Wightman *et al.*, 1991; Wightman *et al.*, 1992).

## GLOCHIDION J.R. & G.Forst.

Evergreen or semideciduous trees or shrubs. Stipules persistent. Leaves alternate, entire, discolorous. Flowers in short axillary or supra-axillary fascicles, monoecious. Perianth 6-merous, in two series, smaller in female flowers. Male flowers with filiform pedicels, perianth obovate, stamens 3, united in a central column. Female flowers pedunculate or epedunculate, styles 3, united, together forming a dome on the apex of the ovary. Fruit a thin walled capsule, depressed globose, 3-locular with 2 ovules per locule, 6-lobed. Seeds red, retained on placenta after capsule wall shed, in shape a segment of a sphere.

The genus contains c. 300 species distributed through tropical Asia, Madagascar, Australasia and Polynesia with a few species in tropical America. Fourteen species are recorded for Australia, 5 in the NT and 2 in the DR. [Airy Shaw, 1980a,b]

- |                                                                                                                  |                      |
|------------------------------------------------------------------------------------------------------------------|----------------------|
| 1. Large tree; inflorescence shortly pedunculate and inserted above the axils;<br>stipules acute to obtuse ..... | <b>G. perakense</b>  |
| 1. Small tree or shrub; inflorescence epedunculate, axillary; stipules subulate .....                            | <b>G. xerocarpum</b> |

### **G. perakense** Hook. f. var. **supra-axillare** (Benth.) Airy Shaw

A tree to 20 m tall. Bark brown, fibrous, inner bark red. Usually glabrous throughout, inflorescence and leaf undersurfaces rarely shortly tomentose. *Stipules* triangular, 1-1.5 mm long. *Petioles* c. 5 mm long. *Leaf blades* elliptic or ovate, less commonly oblong or lanceolate, 65-180 mm long, 25-75 mm wide, L/B (1.3)2-3(4), often unequal, base rounded to cuneate, apex acute to acuminate. *Inflorescence* supra-axillary fascicles on peduncles 1-7 mm long. *Male flowers* on filiform pedicels 3-15 mm long. *Female flowers* on pedicels 4-10 mm long. *Fruit* yellow-green, 5 mm long, 6-10 mm diam., usually tomentose, weakly lobed to entire, up to 6 per inflorescence. *Seeds* pale red, c. 3 mm long. *Flowering* and fruiting: Sept - Mar. Fig. 73

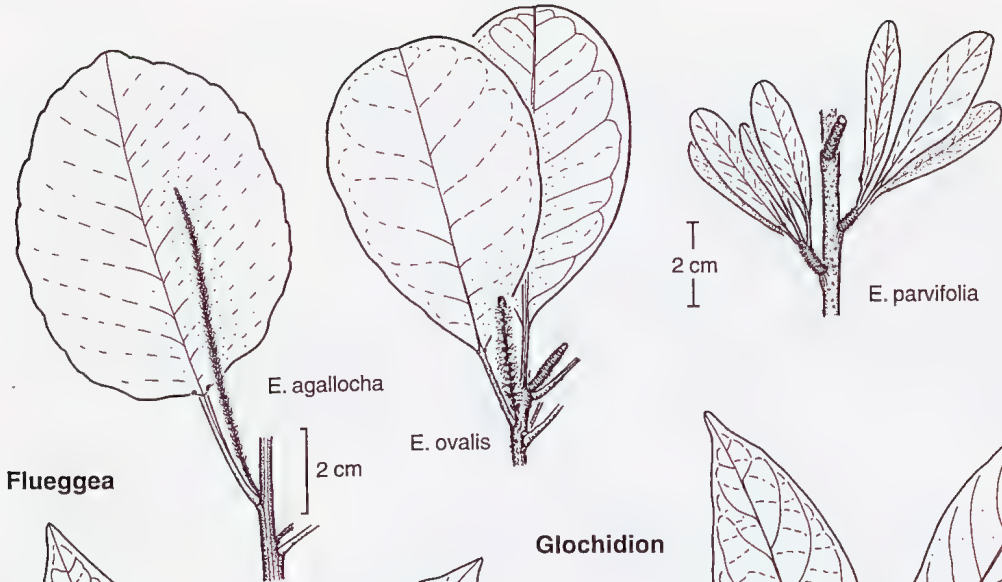
New Guinea, Solomon Is. and northern Australia in Qld and the NT. In the DR, common in its restricted habitat. Occurs in monsoon forest associated with permanent streams.

### **G. xerocarpum** (O.Schwarz) Airy Shaw

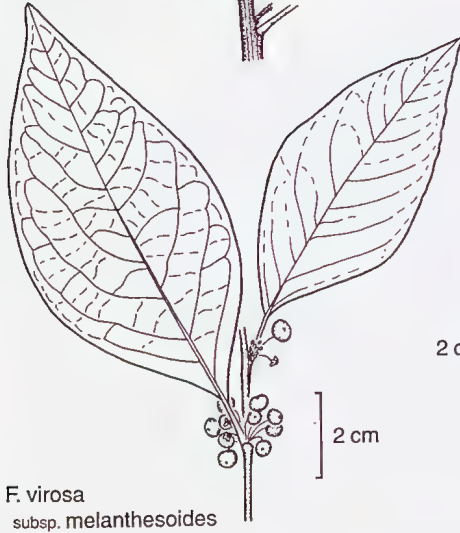
A semideciduous small tree or shrub to 6 m tall. Bark dark grey, rough. All parts with a short whitish tomentellous indumentum, the upper surface of the leaves sparsely hairy to glabrescent. *Stipules* persistent, triangular, tapering to a fine point, 1.5-3 mm long. *Petioles* 2-4 mm long. *Leaf blades* oblong-elliptic, elliptic, ovate or obovate, 35-140 mm long, 10-55 mm wide, L/B 1.6-2.7, base rounded to cuneate, margin entire, apex obtuse to shortly acuminate or acute. Venation prominent or obscure below. *Male flowers*: pedicels 2.5-8 mm long. *Female flowers*: pedicels 4-5 mm long with up to 3 fruit per inflorescence. *Fruit* yellowish-green, depressed globular, 7-8 mm long, 8-15 mm diam., glabrescent, lobed. *Seeds* red, 5-6 mm long. *Flowering*: Sept - Dec; fruiting: Sept - Apr. Fig. 73

Found in Indonesia as far west as Java, in New Guinea, the Philippines and in northern Australia. Common in the DR. The habitat of this species is

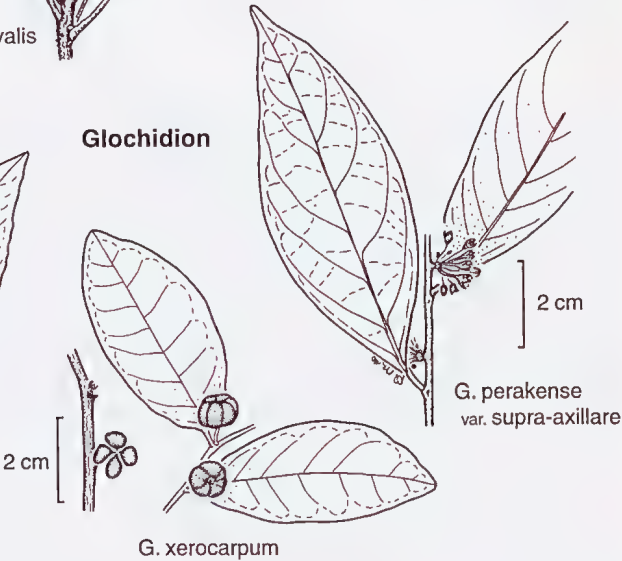
**Excoecaria**



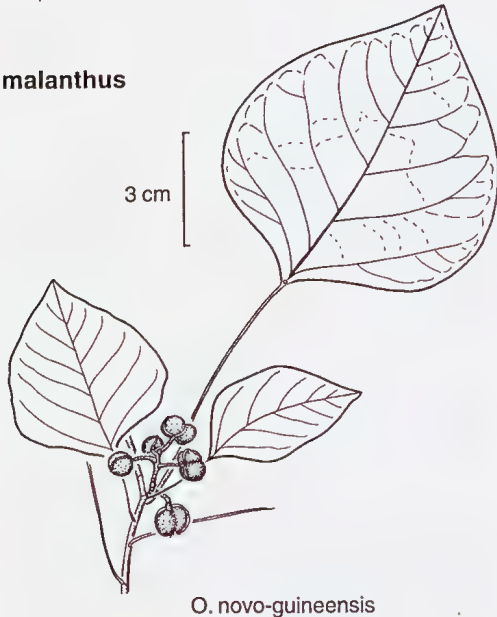
**Flueggea**



**Glochidion**



**Omalanthus**



**Jatropha**

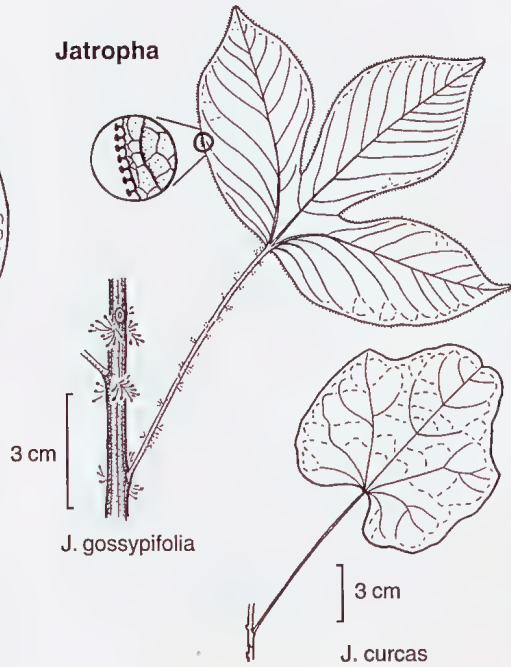


Fig. 73

drier monsoon forest on a variety of soils and occasionally eucalypt forest. The description here includes forms known as *G. apodogynum* Airy Shaw and *G. disparipes* Airy Shaw. *Glochidion xerocarpum* sens. str. occurs in coastal vine thickets and has glabrous leaves with obscure venation below and glabrous or tomentose branchlets. *Glochidion apodogynum* sens. str. is tomentose

on all parts and occurs in subcoastal habitats associated with sandstone while *G. disparipes* may be completely glabrous or have hairy branchlets and occurs in subcoastal monsoon thickets or eucalypt communities. The above characters intergrade between forms. However, all forms have similar leaves, stipules, inflorescences and fruit.

## JATROPHA L.

A genus of 125-150 tropical species occurring primarily in the New World, with many of the other species in Africa. Two species are naturalized in Australia and the NT. Both occur in the DR. *J. curcas* L. is rare in the region and is illustrated (Fig. 73), but not described here. [Everist, 1979; Wagner *et al.*, 1990]. Two other species, *J. multifida* L. with deeply divided leaves and *J. podagrica* Hook. with a short swollen stem are cultivated.

- |                                                                                                                  |                        |
|------------------------------------------------------------------------------------------------------------------|------------------------|
| 1. Leaves and petioles with gland tipped hairs, blades deeply 3-5-lobed; petals red .....                        | <b>J. gossypifolia</b> |
| 1. Leaves and petioles eglandular, blades entire or shallowly lobed;<br>petals greenish to yellowish white ..... | <b>J. curcas</b>       |

### \**J. gossypifolia* L.

A herbaceous *shrub*, deciduous in dry habitats, to 1.5(3) m tall. Stems smooth, exuding a watery sap when broken, angles of branchlets with decurrent tissue. *Stipules* modified to form branched glandular hair-like structures, 4-5 mm long. *Leaves* alternate; petioles 46-115 mm long bearing conspicuous branched gland tipped hairs; blades deeply palmately 3-5-lobed, discolorous, 54-140 mm long, 75-125 mm wide, lobes 25-70 mm long, 15-42 mm wide, surfaces glabrous to densely tomentose, finely pellucid dotted, base cordate to truncate, margin ciliate with simple and capitate glandular hairs, apex of lobes acuminate. *Inflorescence* with a dense

covering of simple and glandular hairs, bracteate. *Flowers* monoecious, in terminal dichasia, 78-120 mm long; petals dark red. *Fruit* a capsule, 10-12 mm long, oblong, with 3 1-seeded locules. *Seeds* pale brown, faintly mottled, 6-8 mm long, c. 4.5 mm wide, flattened-oblong, caruncle finely lobed. *Flowering*: Feb; *fruiting*: Feb - Apr. Fig. 73

Native to the New World but now naturalized throughout the tropics. In Australia the species occurs in Qld, WA and NT. Scattered in the DR, often near past habitation. On a variety of soils, but most commonly on stream banks. In the past, this species was widely propagated for the seeds which contain a purgative oil. The seeds also contain a toxin.

## LEPTOPUS Decne

A genus of c. 15 species, mostly in northern and SE Asia extending to Australia. One species occurs in Australia, the NT and the DR.

### *L. decaisnei* (Benth.) Pojarkova

An annual herb or low shrub to 1 m tall. All parts villous. *Stipules* narrowly triangular, c. 1.5 mm long. *Leaves* alternate; petioles 1-16 mm long; blades

slightly discolorous, obovate to orbicular, 7-33 mm long, 6-21 mm wide, L/B 1.2-1.9; base cuneate to attenuate, margin entire, apex rounded to shortly acuminate. *Inflorescence* of short axillary fascicles



of 2-3 male and 1-2 female flowers. *Flowers* 5-merous, monoecious. *Male flowers*: pedicels c. 2 mm long; calyx lobes oblanceolate, c. 1 mm long; petals narrowly oblanceolate, minute; disk flat, membranous, 10-lobed; stamens c. 0.5 mm long; rudimentary ovary and 3 stigmas present. *Female flowers*: pedicels 2-8 mm long; calyx lobes ovate, c. 2 mm long; petals triangular, c. 0.5 mm long; ovary 3-locular with 2 ovules per locule; stigmas 3, each deeply bifid. *Fruit* a green dehiscent capsule, depressed globose, 2-2.5 mm long, 3.5-4.5

mm diam., each of the 3 cocci containing 2 seeds, calyx lobes persisting and enlarging to 4 mm long. *Seeds* ecarunculate, pale brown to black, transversely rugose, the shape of a spherical sector, ecarunculate. *Flowering* and fruiting: Feb - July. Fig. 74

In Indonesia (Java, Timor), New Guinea and northern Australia, from the Kimberley to Cape York. Uncommon in the DR where known from the south of the region, but more common further south. In a variety of habitats and soil types.

## MACARANGA Thou.

Evergreen shrubs or slender trees with whitish smooth, thin bark. Young shoots, branchlets, stipules and petioles shortly pubescent. Stipules triangular. Leaves alternate, undersurface of blades densely covered with sessile vesicular glands which darken with age, tertiary veins  $\pm$  parallel and forming a scalariform pattern, base 3-5 nerved, margin  $\pm$  entire, with obscure glands at the ends of the veins and blister-like intramarginal glands. Flowers dioecious, in axillary bracteate panicles, spatheate bracts tomentose and densely glandular, with lacinate margins. Fruit greenish, densely covered with granular scale-like glands and scattered filiform scales. Seeds black, shiny, spherical, c. 5 mm diam., ecarunculate.

A genus of c. 280 species distributed through tropical and subtropical Africa, Asia, Australia and western Pacific Islands. In Australia 8 species occur, with 2 in the NT and DR. The local species are fast growing, short lived colonizers of gaps and margins of monsoon forest, forming dense thickets. The straight stems have been used by Aboriginal people as spear shafts (Levitt, 1981; Smith & Wightman, 1990).

- |                                                                                         |                       |
|-----------------------------------------------------------------------------------------|-----------------------|
| 1. Leaves peltate; stipules 8-19 mm long; filiform scales on fruit 6-7 mm long .....    | <b>M. tanarius</b>    |
| 1. Leaves not peltate; stipules <8 mm long; filiform scales on fruit c. 2 mm long ..... | <b>M. involucrata</b> |

### **M. involucrata** (Roxb.) Ballion var. **mallotoides** (F.Muell.) Perry

A slender *tree* to 12 m tall. *Stipules* caducous, c. 4 mm long. Petioles 26-120 mm long. *Leaf blades* deltoid to rhomboid, 75-220 mm long, 50-171 mm wide, L/B 0.9-1.3, undersurface pubescent, veins on upper surface pubescent otherwise glabrous to glabrescent, base shortly cordately lobed with two blister-like glands on the upper surface, apex long acuminate. *Male inflorescence* panicate with racemose branches, 75-210 mm long, pubescent throughout. *Female inflorescence* 60-115 mm long. *Fruit* spherical, c. 5 mm diam., filiform scales c. 2 mm long. *Seeds* persisting after the capsule wall has dehisced. *Flowering*: Mar - Sept; fruiting: Sept - Nov. Fig. 74

Endemic to Qld and the northern NT. Common in the DR. In monsoon forest with a spring-fed watertable, often on floodplain margins and

clayey soils.

### **M. tanarius** (L.) Muell.Arg.

A *shrub* or small tree to 9 m tall, usually with a single stem; a whitish bloom extending to the petioles and stipules. Stems marked with circular leaf scars and transverse linear stipule scars, and exuding a red viscous sap. *Stipules* persisting as long as the leaves, foliaceous, 8-19 mm long. *Leaves* peltate; petioles 50-330 mm long; blades ovate to orbicular, 80-500 mm long, 52-445 mm wide, L/B 1-1.4, glabrous to glabrescent, apex acute to long acuminate. *Male inflorescence* 100-240 mm long, pubescent throughout, spatheate bracts 7-9 mm long. *Female inflorescence* 35-120 mm long, spatheate bracts to 20 mm long. *Fruit* 1-4-locular, c. 6 mm long, 9 mm diam., glands yellow-green and filiform scales 6-7 mm long. *Flowering*: Sept - Oct (June and Dec); fruiting: mainly Oct - Nov. Fig. 74

Widespread, extending north from Australia to southern China. In Australia occurring from Darwin eastward to Cape York and south to

NSW. Occurs in coastal and subcoastal monsoon forest usually in damp swales or on perennial streams.

## MALLOTUS Lour.

Shrubs or slender trees. Branchlets, petioles, young shoots, leaf undersurfaces, and inflorescence with a persistent close tomentum of stellate or dendritic hairs. Undersurface of blades and fruit  $\pm$  covered with sessile vesicular glands. Stipules obscure. Leaves alternate or opposite, discolorous, penniveined with lower pair of secondary veins prominent, and reaching above half way, tertiary veins  $\pm$  parallel and forming a scalariform pattern, base often with a pair of glands, margin  $\pm$  entire, sometimes with glands at the ends of the veins and blister-like intramarginal glands. Flowers dioecious, in axillary or terminal racemes. Fruit 2-3-locular. Seeds usually black, shiny, spherical, ecarunculate.

A genus of c. 140 species occurring widely through the Old World tropics. Eleven species occur in Australia, with 3 in the NT and 2 in the DR. All NT species are treated here. [Airy Shaw, 1980a]

- |                                                                                     |                          |
|-------------------------------------------------------------------------------------|--------------------------|
| 1. Leaves opposite .....                                                            | <b>M. didymochryseus</b> |
| 1. Leaves alternate .....                                                           | <b>2</b>                 |
| 2. Glands on underside of leaves and on fruit red; leaf L/B mostly 1.1-3 .....      | <b>M. philippensis</b>   |
| 2. Glands on underside of leaves and on fruit yellow; leaf L/B mostly 0.9-1.2 ..... | <b>M. nesophilus</b>     |

### M. didymochryseus Airy Shaw

An evergreen *tree* or shrub to 10 m tall. Bark grey, blaze cream. Branchlets, inflorescence, petioles, shoots and fruit encrusted with a dense yellow indumentum of short-armed dendritic hairs. *Leaves* decussate; petioles 16-50 mm long; blades broadly ovate, 50-167 mm long, 35-140 mm wide, L/B 0.9-1.2, upper surface stellate pubescent, undersurface with a soft tomentose indumentum, glands obscure, hyaline, base rounded or cordate, margin entire to shallowly dentate, veins ending in glands covered with tufts of stellate hairs, apex acute to obtuse. *Male inflorescence* 20-80 mm long, female 80-100 mm long. *Fruit* 2-locular, apparently indehiscent, 10-17 mm long, 12-14 mm diam., drying with a coarsely wrinkled surface, glands sparse, hyaline. *Seeds* dark brown, c. 7 mm diam. *Flowering*: Feb; *fruiting*: Feb - July. Fig. 74

Occurring in New Guinea, and northern Australia in WA and E Arnhem Land. Not known from the DR. Usually occurring in coastal vine thickets.

### M. nesophilus Muell.Arg.

A semideciduous *tree* to 8 m tall. Bark pale, grey, fissured. Branchlets, inflorescence, petioles, shoots and leaf undersurfaces with a short dense whitish or rusty tomentum of simple and stellate hairs. *Leaves* alternate; petioles 6-82 mm long; blades ovate or

orbicular, rarely deltoid, rhomboid or elliptic, 20-111 mm long, 15-95 mm wide, L/B 0.9-1.2(1.6), upper surface green, glabrescent with stellate and simple hairs, glands below numerous, yellow, base truncate or cuneate, margin entire, rarely sinuate, apex acute to rounded. *Male inflorescence* 35-150 mm long, female 25-30 mm long. *Fruit* 2-3-locular, apparently indehiscent, c. 5 mm long, 8 mm diam., cocci walls thin, glands yellow turning orange as the fruit ripens. *Seeds* c. 4 mm diam. *Flowering* and *fruiting*: most months. Fig. 74

Endemic to northern Australia, from WA to Qld. Common in the DR. A common species of coastal vine thickets; also in sandstone gorges. The fruit are edible (Levitt, 1981).

### M. philippensis (Lam.) Muell.Arg.

An evergreen *tree* to 10 m tall, rarely more. Bark smooth, pale grey, mottled. *Leaves* alternate; petioles 11-75(124) mm long; blades mostly lanceolate, also ovate or broadly elliptic, 35-210 mm long, 25-100 mm wide, L/B 1.1-3(3.6), upper surface glabrous or with scattered stellate hairs, glands below red, base cuneate or rounded, margin entire, marginal glands obscure, intramarginal glands absent, apex acute to acuminate. *Male inflorescence* 35-65 mm long; female 35-85 mm long. *Fruit* 2-3-locular, 5-6 mm long, c. 7 mm diam., covered with a dense layer of red glands. *Seeds* c. 4 mm diam., adhering to the

placenta after the cocci walls fall. *Flowering*: June - Nov; *fruiting*: Nov - May. Fig. 74

Distributed through Asia from India to New Guinea. In Australia, from northern NSW, through

Qld to the NT. A plant of vine thickets on a variety of soils. The glands on the fruit yield a rich orange-red dye known in India as Kamala dye [Macmillan, 1956].

## MARGARITARIA L.f.

Deciduous shrubs or small trees, dioecious. Glabrous. Branchlets densely lenticellate. Stipules persistent or deciduous. Petioles winged. Leaves alternate, distichous, lateral veins parallel, 7-13 per side, tertiary venation irregular. Bracts and bracteoles present. Inflorescence axillary, fasciculate, sessile. Male flowers: sometimes clustered, pedicellate; sepals 4, free; disk present; stamens 2-4; pistillode absent. Female flowers: sometimes clustered, pedicellate; perianth persistent; sepals free, green, membranous or fleshy; disk present; ovary ovoid. Fruit a capsule, green,  $\pm$  globular, seeds remaining on dissepiment after outer wall of capsule has fallen. Seeds ecarunculate, iridescent blue or blue-green, hemispherical, furrowed on the flat side.

A genus of 14 tropical species of which 2 occur in Australia with both extending to the NT and the DR. [Webster, 1979; Airy Shaw, 1980a; J. Bruhl, pers comm.]

1. Leaves thinly chartaceous or submembranous, acute, blackish-green when dry, margin finely undulate; ovary and fruit 3-locular, 8-11 mm diam., pedicel 10-15 mm long; rainforest ..... **M. indica**
1. Leaves coriaceous, obtuse to emarginate, yellow-veined when dry, margin not undulate; ovary and fruit 2-locular, 5-6 mm diam., pedicel 4-8 mm long; open forest ..... **M. dubium-traceyi**

### **M. dubium-traceyi** Airy Shaw & Hyland

*Shrub* or slender tree to 5 m tall. Bark smooth and flakey. *Stipules* caducous, triangular, membranous, c. 2 mm long. Petioles 4-11 mm long. *Leaf blades* concolorous, elliptic to obovate, 45-134 mm long, 22-75 mm wide, L/B 1.6-2.3, venation pale in dried specimens, apex obtuse,  $\pm$  emarginate, minutely mucronate, margin entire, base attenuate. *Fruit* on pedicels 4-8 mm long; 5-6 mm diam., 2-locular. *Seeds* 4-5 mm diam. *Flowering*: Oct - Nov; *fruiting*: most months. Fig. 74

Distributed eastward from Melville Is., around the Gulf of Carpentaria to Cape York. Grows in sandstone and coastal monsoon forest in the DR and Top End, but around the Gulf growing

with Bulwaddy, Lancewood and Eucalypts. In the DR only known from Melville Is.

### **M. indica** (Dalzell) Airy Shaw

Small *tree* 5-20 m tall. Bark in trees peeling in patches to give a cream and grey mottled appearance, blaze green with pale pink inner bark. *Stipules* persistent or deciduous, lanceolate to triangular, membranous to chartaceous, 1.7-5.6 mm long. Petioles 4.6-12.5 mm long. *Leaf blades* discolorous, elliptic, ovate or obovate, 11-115 mm long, 23-58 mm wide, apex acute, margin finely undulate, base attenuate. *Fruit* on pedicels 9-14 mm long; 7-9 mm diam., 3-locular. *Seeds* c. 3 mm diam. *Flowering*: Nov - Dec; *fruiting*: Jan - Mar. Not illustrated.

SE Asia, New Guinea, Qld and the NT. In the DR only known from Gunn Point in vine thicket.

## MICROCOCCA Benth.

A genus of 12 species found in the Old World tropics. One introduced species occurs in the DR.

### \***M. mercurialis** (L.) Benth.

An annual *herb* to 30 cm tall. Stems striate with

lines of raised tissue and with the petioles, inflorescence, and veins on the undersurfaces of

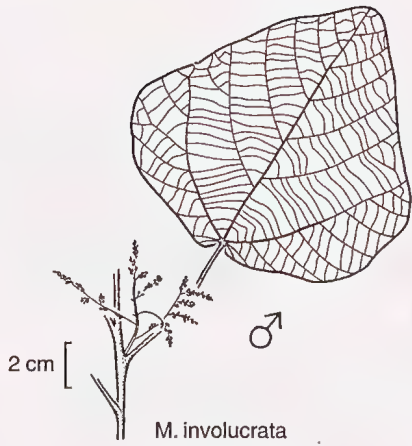


**Leptopus**

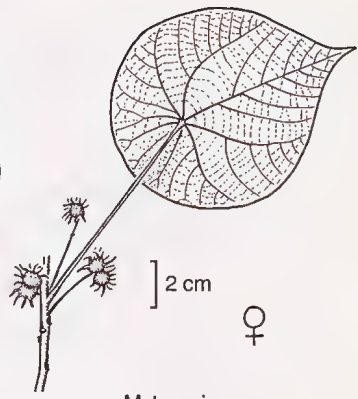


*L. decaisnei*

**Macaranga**

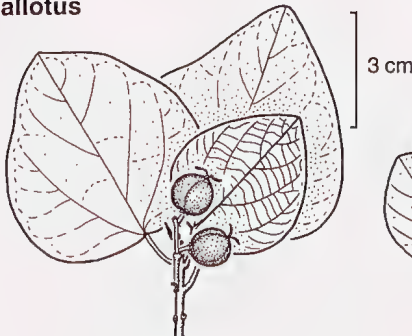


*M. involucrata*  
var. *mallotoides*



*M. tanarius*

**Mallotus**



*M. didymochryseus*



*M. nesophilus*



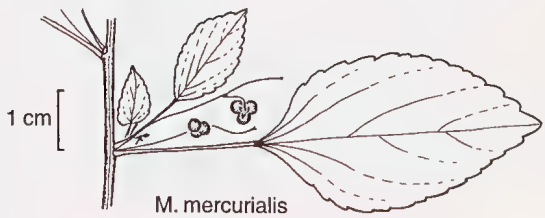
*M. philippensis*

**Micrococca**

**Margaritaria**

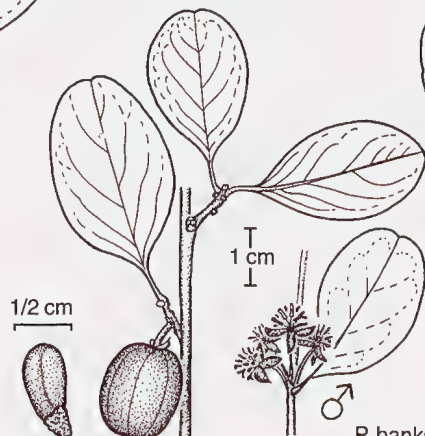


*M. dubium-traceyi*



*M. mercurialis*

**Petalostigma**



*P. banksii*



*P. quadriloculare*

the leaves sparsely pilose with antrorsely curved stiff hairs. *Stipules* minute, gland tipped. *Leaves* alternate; petioles 10-18 mm long, grooved above, with minute, digitate glands at junction of blade; blade discolorous, ovate or elliptic, 24-35 mm long, 10-16 mm wide, L/B 1.6-2.4, lateral veins at an acute angle, surfaces finely pellucid dotted, base rounded to cuneate, margin regularly serrate, lobes incurved so that the minute apical glands are in

the sinuses, apex acute. *Inflorescence* axillary, racemose, to 60 mm long. *Flowers* monoecious. *Fruit* a reddish, dehiscent, 3-locular capsule with 1 seed per locule; 4 mm diam., sparsely pilose. *Seeds* red or grey, c. 2 mm diam., pitted, ecarunculate. *Flowering* and fruiting: Wet season. Fig. 74

Native to tropical Africa and India. An uncommon weed of gardens in Darwin.

## OMALANTHUS A.Juss.

*Homalanthus* A.Juss., orth. variant

A genus of 35 species found in Indo-Malesia, Polynesia and northern Australia, where 3 species are known. In the NT and DR 1 species occurs.

### *O. novo-guineensis* (Warb.) Lauterb. & K.Schum.

A *shrub* or small tree to 15 m with light brown bark bearing old leaf scars. Glabrous throughout. *Stipules* caducous, pale yellow, lanceolate, 13-22 mm long, 4-5 mm wide. Juvenile leaves cordate, to 265 mm long, 233 mm wide on petioles to 325 mm long. *Leaves* alternate; petioles 9-140 mm long; blades discolorous, ovate, broadly ovate or suborbicular, (43)73-176 mm long, (28)50-129 mm wide, L/B 1.0-1.7, with distinct sub-parallel secondary and tertiary veins, base rounded or truncate, 3-veined,  $\pm$  with 2 flat elliptical glands on the blade below and 1 raised discoid gland at the junction of the petiole and blade above, margin entire, apex acuminate or acute. *Inflorescence* a terminal raceme, (20)50-180(275) mm long. *Flowers* in short fascicles of c. 3, subtended by a fan-like bract above a compound gland, monoecious.

*Male flowers*: peduncles to 2 mm long; sepals 2, fan-like, 1-2 mm long; petals 0; stamens usually 6-10, almost sessile, in two rows; disk absent. *Female flowers*: peduncles to 3 mm long; calyx and corolla as for male flowers; ovary bilocular; styles persistent, 2, connate at base, divaricate, recurved, c. 0.5 mm long. *Fruit* mauve, dehiscent, flattened ellipsoid-ovoid, bilocular, c. 9 mm long, 8-9 mm wide, surface mealy, the thin capsule containing two brown seeds enclosed in a thin bright yellow fleshy layer. *Flowering*: most months, peaking in Oct; fruiting: July - Jan. Fig. 73

In eastern Malesia including the Moluccas, Lesser Sunda Is., New Guinea, Solomon Is., and in northern Australia from the Kimberley to Cape York. Common in the DR within its very restricted habitat. Grows in monsoon forest with a high permanent watertable.

## PETALOSTIGMA F.Muell.

Trees or shrubs with simple hairs, eglandular. *Stipules* caducous. *Leaves* alternate, mostly entire. *Flowers* dioecious, in short axillary fascicles. *Fruit* a globular capsule, orange-brown, thinly fleshy, explosively dehiscent, 3-4-locular with 1 seed per locule. *Seeds* pale brown, shiny, flattened-ellipsoid, carunculate, c. 8 mm long.

A genus of 6 species occurring in Australia and New Guinea. Four species in the NT, with 3 in the DR. [Airy Shaw, 1976] Several species have reported medicinal uses (Levitt, 1981; Smith & Wightman, 1990).

- |                                                                    |                          |
|--------------------------------------------------------------------|--------------------------|
| 1. Multi-stemmed subshrub <1 m tall .....                          | <b>P. quadriloculare</b> |
| 1. Small trees, >1 m tall .....                                    | <b>2</b>                 |
| 2. Leaves glabrous or glabrescent below, often oblanceolate .....  | <b>P. banksii</b>        |
| 2. Leaves sericeous below, ovate, narrowly ovate or elliptic ..... | <b>P. pubescens</b>      |

**P. banksii** Britten & S.Moore

A slender deciduous *tree* 2-4 m tall; bark rough. Young growth sericeous, hairs persisting on petioles and leaf veins, otherwise becoming glabrous. *Stipules* c. 2 mm long. *Leaves* often on short lateral shoots; petioles 2-9 mm long; blades glossy above, dull below, oblanceolate to elliptic, 19-50 mm long, 10-30 mm wide, L/B 1.3-2.4, base abruptly attenuate, apex obtuse or emarginate. *Fruit* 12-17 mm long, 13-15 mm wide, glabrous. *Flowering*: Sept - Nov; fruiting: Jan - July. Fig. 74

Endemic to Australia, in Qld and NT north of 20°S. More common in southern parts of the DR. In a variety of habitats, usually on texture contrast soils which become arid during the dry season.

**P. pubescens** Domin

A small evergreen *tree* to 6 m tall, taller south of the DR; bark rough. Young growth, branchlets, petioles and undersides of leaves densely sericeous, sometimes rusty. *Stipules* c. 1.5 mm long. Petioles 4-10 mm long; blades strongly discoloured, ovate, narrowly ovate or elliptic, 18-60 mm long, 9-40 mm wide, L/B 1.2-1.9(2.7), glabrous to glabrescent above, base abruptly attenuate, apex obtuse, often with a

minute mucro. *Fruit* globose to depressed globose, 16-25 mm long, 17-20 mm wide, glabrescent. *Flowering*: Sept - Dec; fruiting: Feb - Oct. Not illustrated.

**Quinine Tree**

Found in northern Australia from the Kimberley to Cape York, in New Guinea, and as far south as northern NSW. Common in the DR. Occurs in open forest and woodland on a variety of soils.

**P. quadriloculare** F.Muell.

An evergreen erect, multi-stemmed *subshrub* to 1 m tall. Young growth and branchlets densely sericeous with a silvery sheen, upper surface of leaves becoming glabrous with age. *Stipules* narrowly triangular, c. 4 mm long. Petioles 4-8 mm long. Leaf blades discoloured, ovate, elliptic or orbicular, rarely narrowly elliptic, 22-70 mm long, 10-50 mm wide, L/B 1.1-2.6, base abruptly attenuate, margin entire or shallowly dentate, slightly inrolled, apex acute or obtuse, often with a minute mucro. *Fruit* globose, 14-18 mm long, glabrous. *Flowering*: May - Nov; fruiting: Mar - July. Fig. 74

Found in northern Australia from the Kimberley to Cape York. Common in the DR. Occurs in savanna usually on skeletal or shallow lateritic soils.

## PHYLLANTHUS L.

Shrubs, subshrubs, annual or perennial herbs (also trees outside DR). Stems foliose throughout or foliage phyllanthoid (distichous on lateral branchlets, giving the appearance of pinnate leaves). *Stipules* persistent, often peltate. Leaves alternate, simple, entire. Flowers small, monoecious, rarely dioecious; tepals usually in two whorls, usually with a defined midrib and coloured hyaline margin; male flowers with disk glands often present; stamens 2-6, filaments free or connate; female flowers with tepals usually larger than males; disk glands often present, variously shaped; ovary usually 3-locular with 2 ovules per locule; styles 3, bifid. Fruit a depressed globular capsule with walls and seeds falling away from a persistent dissepiment, usually lobed, in one species a berry. Seeds trigonous, ecarunculate.

A genus of c. 600 species occurring in tropical and subtropical regions of both hemispheres. About 50 species occur in Australia with c. 20 species in the NT and 11 in the DR.

Three introduced species are commonly in cultivation in the DR. *Phyllanthus emblica* L. and *P. acidus* (L.) Skeels (syn. *P. distichus* Muell.Arg.) are small trees with edible, acid, fleshy fruit (Scholefield, 1984). Both species are illustrated by Hearne (1975) and their uses listed by Macmillan (1956). *P. emblica* has crowded leaves <5 mm wide while *P. acidus* has leaves >15 mm wide. A third species, known in the nursery trade as Waterfall Plant is a common low ornamental shrub.

- |                                                                                                     |                       |
|-----------------------------------------------------------------------------------------------------|-----------------------|
| 1. Scandent shrub with fleshy fruit .....                                                           | <b>P. reticulatus</b> |
| 1. Shrubs, subshrubs or herbs; fruit dry .....                                                      | <b>2</b>              |
| 2. Fruit conspicuously tuberculate; annual herb on floodplains .....                                | <b>P. urinaria</b>    |
| 2. Fruit smooth or almost so .....                                                                  | <b>3</b>              |
| 3. Stems and leaves hispidulous; leaves broadly elliptic to orbicular;<br>white latex present ..... | <b>P. flagellaris</b> |



|     |                                                                                        |                             |
|-----|----------------------------------------------------------------------------------------|-----------------------------|
| 3.  | Plants glabrous; leaves not elliptic or orbicular; latex absent .....                  | 4                           |
| 4.  | Foliage on short lateral branchlets and having the appearance of compound leaves ..... | 5                           |
| 4.  | Foliage present on all stems, not having the appearance of compound leaves .....       | 7                           |
| 5.  | Leaves >4 times as long as wide; seeds muricate-striate .....                          | <b>P. maderaspatensis</b>   |
| 5.  | Leaves <3 times as long as wide; seeds not muricate-striate .....                      | 6                           |
| 6.  | Seeds with 5-7 raised longitudinal ridges .....                                        | <b>P. amarus</b>            |
| 6.  | Seeds transversely rugose .....                                                        | <b>P. lei</b>               |
| 7.  | Mature capsules 1-2 mm diam.; tepals <0.5 mm long .....                                | <b>P. minutiflorus</b>      |
| 7.  | Mature capsules >2 mm diam.; tepals >0.5 mm long .....                                 | 8                           |
| 8.  | Capsule >5 mm diam. ....                                                               | <b>P. 'Golden Sands'</b>    |
| 8.  | Capsule <5 mm diam. ....                                                               | 9                           |
| 9.  | Shrub to 2 m tall; leaves 5-15 mm wide .....                                           | <b>P. grandisepalus</b>     |
| 9.  | Subshrubs mostly <0.5 m tall; leaves <6 mm wide .....                                  | 10                          |
| 10. | Seeds smooth, obscurely areolate .....                                                 | <b>P. sp. aff. virgatus</b> |
| 10. | Seeds muricate or colliculate .....                                                    | 11                          |
| 11. | Pedicels >3 mm long; perennial on well drained sites .....                             | <b>P. trachygynae</b>       |
| 11. | Pedicels <2.5 mm long; annual on heavy soils .....                                     | <b>P. maderaspatensis</b>   |

**\*P. amarus** Schum. & Thonn.

An annual, glabrous *herb* to 60 cm tall. *Stipules* setaceous, c. 2 mm long. *Leaves* phyllanthoid, almost sessile on petioles to 1 mm long; blades discolorous, oblong, often broader towards the apex, 4-12 mm long, 1.6-5 mm wide, L/B 2.2-2.5, base obtuse, apex rounded. *Flowers*, usually 1 of each sex in the outer leaf axils; males on pedicels c. 1.8 mm long; females on pedicels 1-2.5 mm long; tepals oblanceolate with broad white margins, c. 1 mm long. *Capsule* green, smooth, 1-1.5 mm long, 1.5-2 mm diam. *Seeds* pale brown, c. 1 mm long, with 5-7 raised longitudinal ridges on the outer surface and with concentric ridges on the sides. *Flowering* and fruiting: most months. Fig. 75

A pantropic weed apparently native to the New World. A common weed in suburban Darwin and elsewhere.

**P. flagellaris** Benth.

A prostrate hispid (rarely glabrous) herb shooting each year from a perennial rootstock. Stems reddish, foliose throughout, to 40 cm long. *Stipules* c. 1 mm long. *Leaves* exude milky latex when broken; petioles to 0.5 mm long; blades elliptic, obovate to orbicular, 5-13 mm long, 4-9 mm wide, L/B 0.8-1.6, base obtuse or cordate, apex obtuse with a minute mucro. *Flowers* dioecious in fascicles in the outer axils; males with conspicuous globular glands;

females solitary in the outer axils, on pedicels c. 5 mm long; tepals green with a narrow white or red margin, unequal, oblanceolate c. 4 mm long; disk prominent, irregularly lobed. *Capsule* pale brown, smooth, c. 3 mm long, 6 mm diam. *Seeds* brown, c. 2.5 mm long, surface smooth, minutely hairy, apical end shortly pointed. *Flowering* and fruiting: Nov - July. Fig. 75

Apparently endemic to the Top End of the NT. Relatively common in the DR on lateritic and red earth soils in open forest.

**P. grandisepalus** F.Muell. ex Muell.Arg.

An erect, perennial *shrub* to 2 m tall, foliose throughout. Often glaucous with all parts excluding the capsule minutely white papillose, or smooth and glabrous. *Stipules* reddish, 1-1.5 mm long, triangular. *Petioles* to 1 mm long; leaf blades slightly discolorous, narrowly obovate, 7-25 mm long, 5-15 mm wide, L/B 1.4-2.8, base obtuse to cuneate, apex obtuse with a minute mucro. *Flowers* either solitary in the axils or with 2 males and 1 female together; tepals green with a narrow white; males almost sessile; margin, tepals c. 1 mm long; females on pedicels 3-4 mm long; tepals elliptic or narrowly obovate, 3-6 mm long, 1.5-4 mm wide. *Capsule* pale brown, smooth, c. 3 mm long, 4-4.6 mm diam. *Seeds* pale brown with white longitudinal striations and faint horizontal lamellae on sides and back,

c. 2 mm long. *Flowering* and fruiting: Dec - June, occasionally later. Fig. 75

Apparently endemic to the northern NT. Relatively common in the DR on sandy soils often associated with sandstone. This species is very close to *P. carpentariae*, F.Muell. ex Muell.Arg. with which it intergrades. In some specimens from drier parts of the Top End the papillae have developed into short hairs, leaves become smaller and the white striations on the seeds become obscure.

***P. lei* S.Moore**

An erect annual, glabrous *herb* to 40 cm tall, often with reddish stems. Foliage phyllanthoid. *Stipules* c. 0.7 mm long, subulate. *Leaves* on petioles <0.5 mm long; blades oblong, obovate or oblanceolate, 2.5-14 mm long, 1-5 mm wide, L/B 2-3, base obtuse or cuneate, often unequal, apex obtuse often with a minute mucro. *Flowers* monoecious; male flowers few, 1 or 2 together in upper axils; female flowers one per axil, on pedicels 0.5-2 mm long; tepals greenish or hyaline, linear, c. 0.9 mm long, recurved after capsules dehisce. *Capsule* red, faintly warted especially when young, 1-1.5 mm long, 2-2.5 mm diam. *Seeds* pale brown, c. 1 mm long, the back transversely rugose with 8-10 ridges and the sides with a lunar cavity. *Flowering* and fruiting: Mar - June. Fig. 75

Apparently endemic to the northern NT between Darwin and the Gulf of Carpentaria. Comparatively common in the DR on seasonal soaks and seepage areas on sandy soils.

***P. maderaspatensis* L.**

A blue-green, glabrous annual or biennial *herb* or subshrub to 70 cm tall. Branchlets angular, foliage phyllanthoid and on main stems. *Stipules* c. 1-2 mm long, membranous with a red midrib, patent. Petioles c. 1 mm long; leaf blades oblanceolate, spatulate or linear-oblong, 9-35 mm long, 2-6 mm wide, L/B 4-11.5, base obtuse or cuneate, apex obtuse or acute often with a minute mucro. *Flowers* monoecious with 2 male and 1 female flowers in axillary fascicles; male flowers on pedicels c. 1 mm long; female flowers on pedicels c. 2 mm long; tepals with broad white margins, obovate, 1.5-2 mm long. *Capsule* grey, smooth, c. 1.5 mm long, 3 mm diam. *Seeds* pale brown, c. 1.5 mm long, muricate-striate, the back with longitudinal rows of tubercles, the sides with concentric rows. *Flowering* and fruiting: mostly Jan - July, occasionally later. Fig. 75

Found throughout the Old World tropics and widespread in northern Australia. Rare in the DR although common in more inland areas, occurring on heavy clay soils.

***P. minutiflorus* F.Muell. ex Muell.Arg.**

An erect or decumbent annual, glabrous *herb* to 30 cm tall. Stems foliose throughout. *Stipules* c. 0.5 mm long, membranous. Petioles c. 0.5 mm long; leaf blades elliptic, obovate, oblong, linear-oblong or rarely orbicular, 3-12 mm long, 1.2-5 mm wide, L/B 1.3-5, base obtuse, apex obtuse or acute occasionally with a minute mucro. *Flowers* monoecious with 1 or 2 male flowers together with 1 female flower in fascicles in upper axils; female flowers on filiform pedicels 1-3 mm long; tepals with hyaline margins and a dark midrib, elliptic, c. 0.4 mm long. *Capsule* green to pale brown, smooth, 0.8-1 mm long, 1-2 mm diam. *Seeds* brown, 0.6-0.8 mm long, regularly muricate to colliculate. *Flowering* and fruiting: Mar - July. Fig. 75

Found in northern Australia from the Kimberley to Cape York and in New Guinea. Comparatively common in the DR on seasonally damp sandy soils.

***P. reticulatus* Poir.**

A deciduous, scandent perennial *shrub* with stems to 15 cm diam., glabrous or densely hispidulus, foliage not obviously phyllanthoid. *Stipules* 1-2 mm long, triangular. *Leaves* on petioles 1-5 mm long; blades discolorous, ovate or oblong orbicular, 13-64 mm long, 11-36 mm wide, L/B 1.1-2.3(2.6), base attenuate to truncate, apex acute or obtuse. *Flowers* monoecious males and females usually together in dense fascicles of up to 15 flowers, often racemose on slender leafless branchlets; males almost sessile or shortly pedicellate; females on pedicels to 0.6 mm long; tepals green with a broad hyaline margin, orbicular, 1-1.5 mm long. *Fruit* fleshy, maturing blue-black, 4-5 mm long, 4-8 mm diam, 6 or more locular. *Seeds* pale brown c. 2.5 mm long, finely reticulate. *Flowering* and fruiting: most months. Fig. 75

Found throughout the Old World tropics and widespread in northern Australia. Common in the DR, occurring in monsoon forest in a variety of situations, or in riparian habitats. Included here is *P. ciccoides* Muell.Arg. *sensu* Airy Shaw (1980b) including var. *puberulous* Airy Shaw. Webster & Airy Shaw (1971) distinguish *P. ciccoides* from *P. reticulatus* in having *inter alia* deciduous tepals. The species treated here has persistent tepals and appears to be equivalent to the species described by Backer & Bakhuizen van den Brink (1963) and Hooker (1885) as *P. reticulatus*.

***P. trachygyn* Benth.**

An erect, glabrous, 1-4-stemmed *subshrub* to 60

Phyllanthus

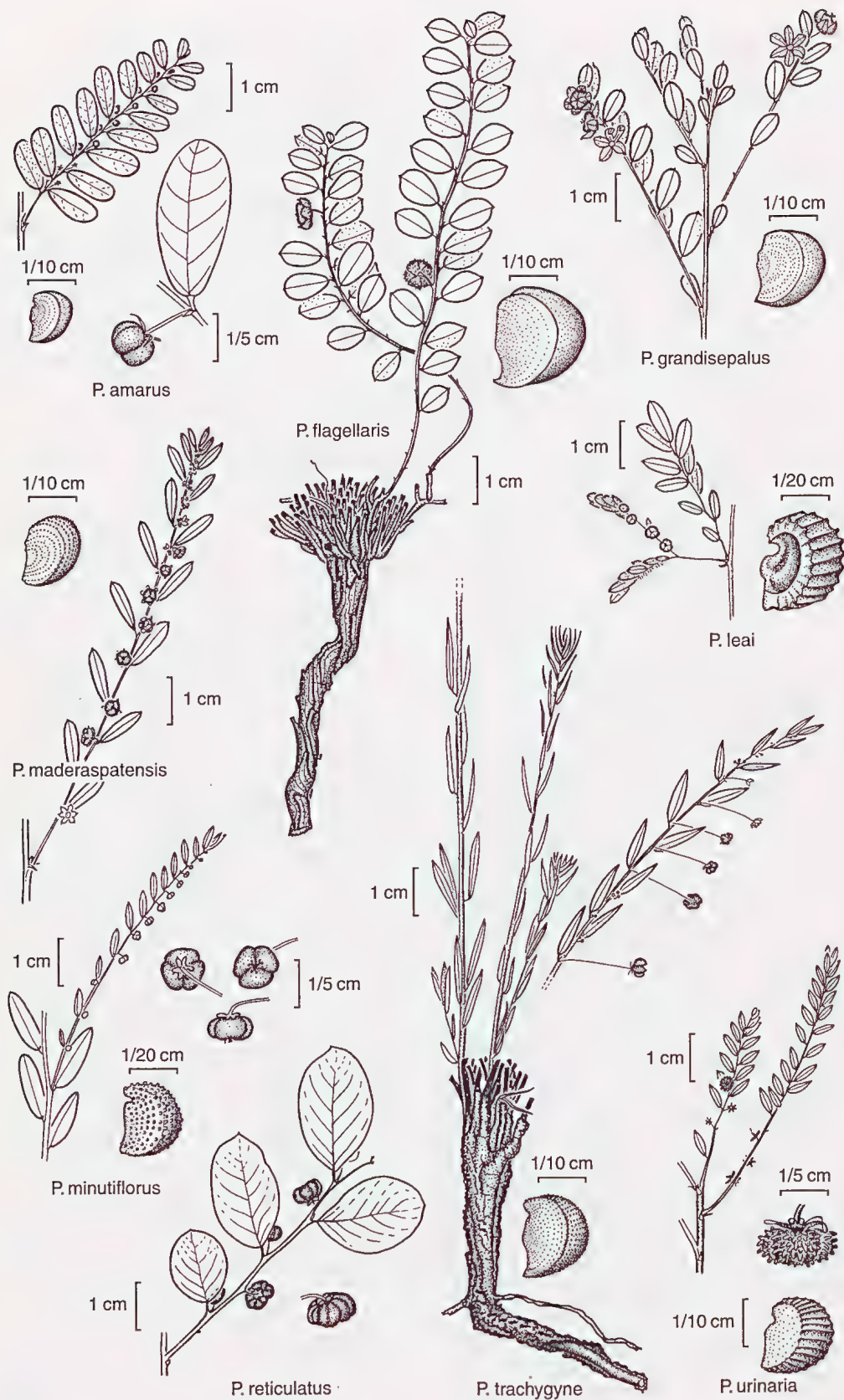


Fig. 75



cm tall, shooting each year from a perennial rootstock. Branchlets finely ribbed with decurrent tissue from the leaf bases, foliose throughout, largely unbranched. *Stipules* 1-2 mm long, broadly triangular. Petioles to 1 mm long; *leaf blades* discolorous, narrowly lanceolate, narrowly elliptic or oblong, 6-22 mm long, 2-5 mm wide, L/B 2.5-8.8, base rounded or cuneate, apex obtuse to acute. *Flowers* monoecious; 1 female and 1-2 males in axils; males on pedicels c. 4 mm long; females on filiform pedicels 3-16 mm long; tepals with red midrib and broad hyaline margins, linear-oblong, 1-1.5 mm long. *Capsule* grey-brown, smooth, c. 2 mm long, 3-4 mm diam. *Seeds* grey when mature, c. 2 mm long, regularly muricate to colliculate. *Flowering* and fruiting: Jan - May. Fig. 75

Occurs in northern Australia from the Kimberley to northern Qld. In the NT, the species occurs in near coastal areas including Melville Is. Relatively common in the DR, often on poorly drained soils.

#### **P. urinaria** L.

An erect, glabrous annual *herb* to 1 m tall with one main stem. Branchlets angular or narrowly winged, foliage phyllanthoid. *Stipules* c. 1 mm long, setaceous. *Leaves* almost sessile; blades narrowly lanceolate, linear-oblong, often obovate, 5-15 mm long, 3-5 mm wide, L/B 1.6-3.5, base obtuse, asymmetric, apex obtuse or acute often with a minute mucro. *Flowers* monoecious with 1-2 male and 1 female flower in axillary fascicles; male flowers falling early, on pedicels to 1; female flowers on pedicels to 1 mm long; tepals with a narrow green midrib and broad hyaline margins, narrowly lanceolate, c. 1 mm long. *Capsule* greenish, tuberculate, 2-2.5 mm long, 3-4 mm diam. *Seeds* brown, c. 2 mm long, the back with c. 20 rows of transverse ridges, the ridges and sides of the seed muricate. *Flowering* and fruiting: usually Feb - June. Fig. 75

A widespread species in the Old World tropics, also occurring in northern Qld. Common in the DR on heavy soils on floodplains.

#### **P. 'Golden Sands'**

An erect, glabrous few to many stemmed *subshrub* to 50 cm tall, shooting each year from a woody perennial rootstock. Stems reddish, angular, foliose throughout, unbranched. *Stipules* c. 1 mm long. Petioles 1-1.5 mm long; *leaf blades* held erect against the stems, slightly discolorous, narrowly elliptic-oblong to linear, 9-28 mm long, 1-9 mm wide, L/B 2.1-9, base obtuse, apex acute with a minute mucro. *Flowers* dioecious; tepals green with

a narrow hyaline margin; males in fascicles of up to 4 flowers on filiform pedicels 0.5-2 mm long; tepals c. 1 mm long, coriaceous; females solitary in the axils on pedicels 10-12 mm long; tepals lanceolate, 3-3.5 mm long. *Capsule* pale brown, smooth, 3-4 mm long, c. 6 mm diam. *Seeds* pale brown, c. 2 mm long, smooth, sharply angled. *Flowering* and fruiting: Aug - Feb. Fig. 76

Apparently endemic to the Top End of the NT. Common in the DR on well drained soils in open forest and woodland.

#### **P. sp. aff. virgatus** Forst.f.

An erect, glabrous, many stemmed, broom-like *subshrub* to 60 cm tall. Stems angular, foliose throughout. *Stipules* c. 1 mm long. Petioles to 1 mm long; leaf blades held erect against the stems, slightly discolorous, linear-oblong to linear, 4-15 mm long, 1-3.5 mm wide, L/B 2.5-6, base rounded, apex obtuse. *Flowers* 1 female and 2 males in fascicles in the axils; females on filiform pedicels 5-7 mm long; tepals with a red midrib and a broad hyaline margin, c. 1 mm long. *Capsule* pale brown, smooth to obscurely pustulate, c. 2 mm long, 3 mm diam. *Seeds* brown, c. 2 mm long, smooth, obscurely areolate, usually slightly shiny. *Flowering* and fruiting: Dec - July. Fig. 76

A common species in the drier areas south of the DR, with a few local records. Occurs in a variety of habitats. *Phyllanthus virgatus sens. lat.* is a widespread tropical species. The group is in need of revision and no doubt includes a number of taxa.

### **Phyllanthus**

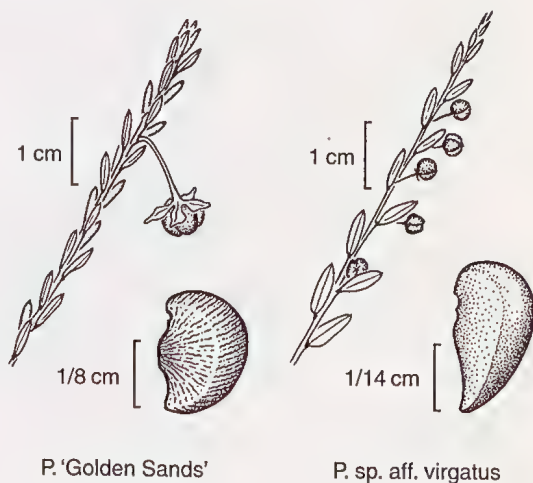


Fig. 76

# PORANTHERA Rudge

A genus of 10 species in Australia and New Zealand; 3 in the NT and 1 in the DR.

## **P. microphylla** Brongn.

Annual glabrous erect *herb*, to 7 cm high. Stipules membranous, subulate, c. 1.5 mm long, sometimes toothed. *Leaves* alternate, simple, entire, discolorous, spatulate, 12-20 mm long, 4-6 mm wide, midrib prominent below. *Inflorescence* a compact terminal bracteate head-like raceme to 10 mm long. Bracts foliaceous, 1.5-2 mm long. Pedicels 2.5-6 mm long. *Flowers* monoecious; sepals 5,  $\pm$ free, linear to narrowly oblanceolate, white with pinkish markings; petals 5,  $\pm$ free, much smaller than sepals or obscure. *Male flowers*: sepals 0.6-0.8 mm long; stamens 5, free; anthers 4-locular, opening by terminal pores.

*Female flowers*: ovary 3-celled, each cell with 2 ovules, 6-lobed; styles 3, divided almost to base into 2 linear branches. *Fruit* a thin-walled dehiscent capsule, depressed globular, c. 2 mm diam. *Seeds* 6, reddish, in shape a segment of a sphere, c. 0.6 mm long, alveolate; caruncle absent. *Flowering* and fruiting: Mar - July. Fig. 77

In all mainland states and New Zealand; widespread though uncommonly collected across the Top End; scattered records in the DR from Melville Is. to Litchfield NP. Found in open forest. A variable taxon over its range and as presently circumscribed almost certainly includes several taxa.

# SAUROPUS Blume

Subshrubs or perennial herbs, in the DR with annual aerial parts. Stems usually foliose throughout, rarely phyllanthoid. Stipules persistent. Leaf blades alternate, entire, coriaceous, almost sessile, with a strong central vein usually ending in a minute mucro, and with obscure secondary venation. Flowers dioecious or monoecious, axillary; perianth usually thick and coriaceous and lacking the hyaline margin seen in *Phyllanthus*. Male flowers with tepals in two whorls of 3, free or connate into a tube; stamens 3, usually connate into an androphore; disk absent. Female flowers with tepals in 2 whorls of 3, shortly connate, mostly larger than in the male; disk absent; ovary 3 locular with 2 ovules per locule; styles entire or bifid. Fruit a capsule (in DR), ovoid or ellipsoid. Seeds triquetrous, exarillate.

A genus of c. 40 species occurring from tropical Australia to India. About 25 species occur in Australia, with c. 15 species in the NT and 6 in the DR. This genus was treated in the Flora of Central Australia (Jessop, 1981) as *Synostemon*.

|                                                                                     |                             |
|-------------------------------------------------------------------------------------|-----------------------------|
| 1. Leaves cordate .....                                                             | <b>S. ditassoides</b>       |
| 1. Leaves not cordate .....                                                         | 2                           |
| 2. Flowering stems leafless or with 1-3 leaves .....                                | <b>S. 'Darwin'</b>          |
| 2. Flowering stems with numerous leaves .....                                       | 3                           |
| 3. Leaves broad, usually <3 times longer than wide .....                            | 4                           |
| 3. Leaves narrow, >3.5 times longer than wide .....                                 | 5                           |
| 4. Plants glabrous; leaves concolorous, margins flat .....                          | <b>S. ochrophyllus</b>      |
| 4. Plants pilose; leaves discolorous, margins recurved .....                        | <b>S. 'Melville Island'</b> |
| 5. Leaves linear, 0.5-0.6 mm wide; tepals in male flower c. 1.5 mm long .....       | <b>S. glaucus</b>           |
| 5. Leaves narrowly elliptic, 1.5-9 mm wide; tepals in male flowers >2 mm long ..... | <b>S. 'Tiwi'</b>            |

## **S. ditassoides** (Muell.Arg.) Airy Shaw

*Phyllanthus ditassoides* Muell.Arg.

A prostrate or erect several stemmed *herb* to 45 cm tall. Branchlets terete, usually foliose

throughout. Stems, leaf margins, veins and tepals hispidulous. *Stipules* c. 0.5 mm long. *Leaf blades* slightly discolorous, ovate, broadly ovate to orbicular, 4-35 mm long, 5-32 mm wide,

L/B 0.8-1.5, base cordate, apex obtuse to acute with a minute mucro. *Flowers* dioecious or monoecious; males in fascicles in the outer axils; females solitary in the axils on pedicels 2-3 mm long; tepals spatulate, 2-3 mm long. *Capsule* grey, smooth, ovoid-ellipsoid, 7-9 mm long, 7-8 mm diam. *Seeds* brown, c. 6 mm long, smooth, minutely areolate, sharply angled. *Flowering* and fruiting: Oct - July. Fig. 78

Apparently endemic to the central and western Top End of the NT. Relatively common in the DR on sandy or other well drained soils in open forest and woodland.

**S. glaucus** (F.Muell.) Airy Shaw

*Phyllanthus glaucus* (F.Muell.) Baillon

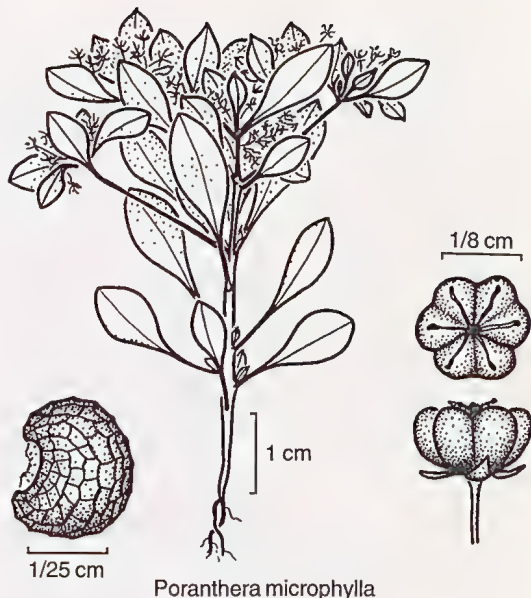
An erect, glabrous multistemmed *subshrub* to 50 cm tall. Stems striate with fine grooves, foliose throughout. *Stipules* c. 0.5 mm long, subulate. *Leaves* blades linear, 4-14 mm long, 0.5-0.6 mm wide, L/B 8-23. *Flowers* dioecious or monoecious; males 1-2 in axils, on pedicels c. 1 mm long; tepals spatulate, c. 1.5 mm long, connate for 1/2 their length; females solitary in axils, on pedicels c. 5 mm long; tepals spatulate, 6-12 mm long; styles spreading, almost entire. *Capsule* grey, smooth, ellipsoid, 10-12 mm long, c. 7 mm diam. *Seeds* grey when mature, c. 8 mm long, with a thin firm spongy, irregularly pitted surface, margins sharply angled with irregular scallops. *Flowering* and fruiting: Aug - May. Fig. 78

Probably an NT endemic; widespread in the Top End. In the DR this species is known from Litchfield NP where it occurs on fine sandy soils on sandstone and from south of Bynoe Harbour and east of the Bark Hut Inn.

**S. ochrophyllus** (Benth.) Airy Shaw

*Phyllanthus ochrophyllus* Benth.

An erect glabrous single-stemmed *subshrub* to 30 cm tall. Stems flattened, foliage phyllanthoid or plants foliose throughout. *Stipules* filiform, c. 0.5 mm long. *Leaf blades* concolorous, elliptic, obovate or ovate, 8-47 mm long, 4-30 mm wide, L/B 1.2-2.6, base broadly cuneate, apex acute or obtuse with a minute mucro. *Flowers* dioecious or monoecious, solitary in the axils, yellow-green, pendulous, on pedicels 2-3 mm long, tepals narrowly lanceolate, lacking a distinct midrib; males with tepals c. 3 mm long, apex slightly recurved; females with tepals c. 4 mm long, styles erect, c. 2 mm long, shortly connate at base, bifid. *Capsule* ovoid, c. 9 mm diam. *Seeds* not seen. *Flowering* and fruiting: Oct - Dec. Fig. 78



*Poranthera microphylla*

Fig. 77

Apparently endemic to the DR, but poorly collected. This species occurs on well drained soils in open forest and woodland.

**S. 'Darwin'**

An erect glabrous single-stemmed *subshrub* to 50 cm tall. Stems striate, finely fluted, unbranched or occasionally branched at an acute angle, with 0-several leaves. *Stipules* 2-2.5 mm long. *Leaves* widely spaced, blades blue-green when fresh, variable in shape, lanceolate, linear, to elliptic or ovate, 30-55 mm long, 3-27 mm wide, L/B 1.3-13, base attenuate, obtuse or cuneate, apex acute to obtuse. *Flowers* dioecious, or monoecious on separate branches; males in fascicles of 1-several flowers in axils on leafless branches; tepals yellow-green, unequal, elliptic, 2-2.5 mm long; stamens 3, anthers fused to the angles of rhomboid structure on a short androphore, axis of androphore exceeding the anthers; females solitary in the axils, often on leafless branches; pedicels 5-9 mm long; tepals yellow-green, unequal, elliptic, 3-4 mm long. *Capsule* pale green, ellipsoid, indistinctly 3-lobed, c. 8 mm long, 10 mm diam. *Seeds* stramineous, c. 7 mm long. *Flowering* and fruiting: Oct - Jan. Fig. 78

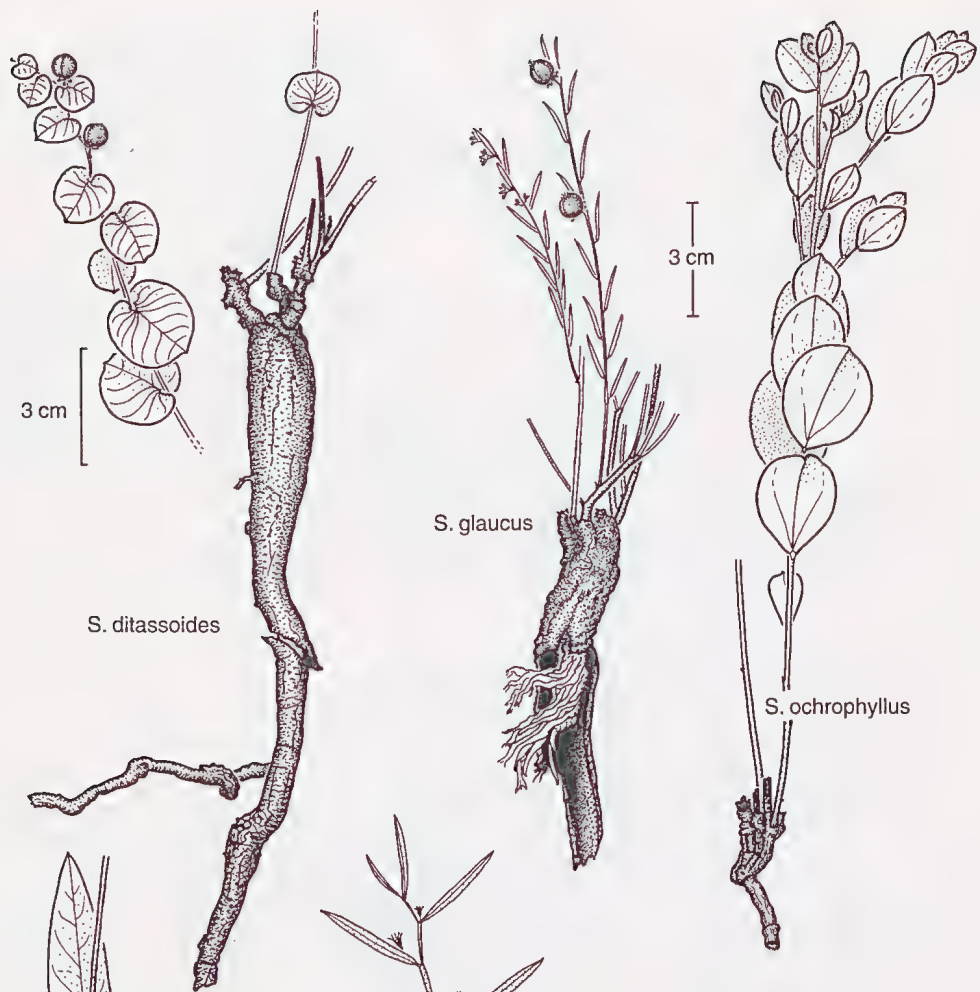
Apparently endemic to the Top End, and common but poorly collected. This species occurs on a variety of soils in open forest and woodland.

**S. 'Melville Is.'**

An erect multistemmed *subshrub* to 50 cm tall. Stems angular, finely striate, foliose throughout.



**Sauropus**



**Sebastiania**

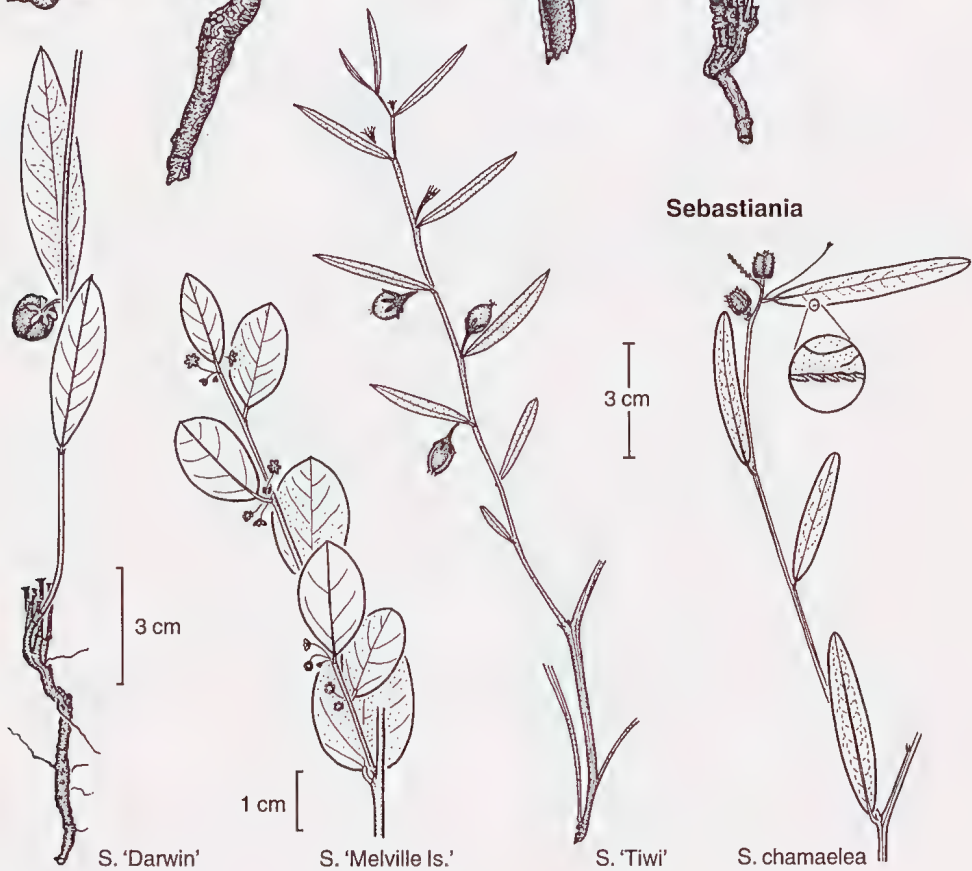


**Fig. 78**

Leaves and stems may be glabrous or pilose with coarse patent hairs. *Stipules* c. 3 mm long. *Leaf blades* slightly discolorous, elliptic, obovate or ovate, 14-40 mm long, 9-21 mm wide, L/B 1.4-2, base cuneate or obtuse, margin recurved. *Flowers* dioecious; males in fascicles in the axils, on pedicels 2-4 mm long; tepals c. 2.5 mm long; anthers almost sessile; females solitary in the axils, on pedicels 3-7 mm long; tepals obovate, 2-2.5 mm long; styles spreading, fused to the top of the ovary; stigmas erect. *Capsule* not seen. *Seeds* not seen. *Flowering*: Aug - Dec. Fig. 78

Probably endemic to the NT; recorded from Melville Is. and coastal Arnhem Land. This species occurs on deep sandy soils either in open forest or on treeless plains.

#### S. 'Tiwi'

An erect to procumbent, glabrous few-multistemmed *subshrub* to 30 cm tall. Stems

angular, foliose throughout. *Stipules* brown, c. 1 mm long. *Leaf blades* slightly discolorous, narrowly elliptic, lanceolate or occasionally linear, 11-40 mm long, 1.5-9 mm wide, L/B 4.2-10, base attenuate, apex acute. *Flowers* dioecious; males in fascicles in the axils, on pedicels 1-3.5 mm long; tepals 2.5-4 mm long, connate for 2/3 to 3/4 of their length, apex of androphore acute and exceeding the anthers; females solitary in the axils, on pedicels 1-6 mm long; tepals linear, 3-4 mm long; styles bifid. *Capsule* grey, smooth, ovoid, 7-10 mm long, 6-9 mm diam. *Seeds* white-brown, 6-9 mm long, with a thin firm spongy, irregularly pitted surface, margins sharply angled with irregular scallops. *Flowering* and fruiting: mainly Sept - May, but also at other times following fire. Fig. 78

Probably endemic to the western Top End of the NT. In the DR this species is common and occurs on well drained, often sandy soils in open forest and woodland.

## SEBASTIANIA Spreng.

A genus of c. 100 species occurring mainly in the New World. One species occurs in Australia.

#### S. chamaelea (L.) Muell.Arg.

An erect glabrous slender evergreen *shrub* to 1 m tall. Stems finely ribbed. *Stipules* c. 1 mm long, persistent, margins often fimbriate. *Leaves* simple, alternate, bifacial, on petioles 1-5 mm long; blades narrowly elliptic, oblong, oblanceolate, rarely linear-oblong or ovate, 12-70 mm long, 2-18 mm wide, L/B (2.2)3.5-9(16), base attenuate, margins sclerotic, regularly and finely serrulate with (1)2 depressed glands on each side c. 3 mm up from the base, apex acute, obtuse or emarginate. *Flowers* dioecious or occasionally monoecious; males in minute slender spikes 27-50 mm long; tepals 3, ovate to orbicular, <1 mm long, with fimbriate margins;

anthers 3, almost sessile, globular. Females solitary in the axils or at the base of the male inflorescence, subtended by fimbriate bracts with a pair of axillary stipitate glands, pedicels stout, c. 2 mm long, tepals similar to male, 1.5-2 mm long, sometimes with red filiform glands, styles 3, spreading. *Capsule* 3-locular with 1 seed per locule, greenish often with a tinge of red, oblong, 5-7 mm long, c. 6 mm diam., smooth or with 2-4 pairs of spines on each locule. *Seeds* flattened oblong, c. 5 mm long, mottled, carunculate. *Flowering* and fruiting: most months. Fig. 78

An Old World species distributed from India to northern Australia. In Australia common in savanna on well drained soils.

## GLOSSARY

- abaxial:** away from the axis from which it arises, e.g. leaf surface or floral organ; cf. adaxial.
- achene:** a dry but not woody, indehiscent, single-seeded fruit.
- actinomorphic:** radially symmetrical, especially of corolla.
- acuminate:** tapering gradually or abruptly to a sharp point, the sides of the apex slightly concave (Fig. 80).
- acute:** pointed; with the apex forming a sharp angle (Fig. 80).
- adaxial:** nearest to the axis from which it arises, e.g. leaf surface or floral organ; cf. abaxial.
- adnate:** fusion of dissimilar organs, e.g. of stamens to petals.
- adpressed:** pressed closely against; appressed.
- aerenchyma:** spongy, air filled tissue present in some plants, e.g. water plants such as *Nymphaea* and *Sesbania*.
- alternate:** with one at each node at different parts of the stem (Fig. 80).
- amphicarpic:** producing two kinds of fruits, e.g. aerial and underground as in some species of *Glycine*.
- amplexicaul:** clasping the stem (Fig. 80).
- anastomosing:** of venation, where the minor veins connect with one another (Fig. 1).
- androecium:** stamens; pollen bearing organs of a flower.
- androgynophore:** a stalk bearing both the androecium and gynoecium of a flower above the point of perianth attachment.
- androgynous:** when male and female flowers are found in the one inflorescence.
- androphore:** a stalk or column bearing the androecium of a flower (Fig. 79).
- annual:** completing life-cycle within one year.
- annular:** ring-like or arranged in a ring.
- anther:** organ in which pollen is produced (Fig. 79).
- anthocarp:** a fruit plus the persistent base of its surrounding perianth.
- apical placentation:** of ovules attached to the apex of an ovary (Fig. 79).
- apiculate:** tipped with a small sharp flexible point.
- apocarpous:** (of a pistil or gynoecium) consisting of one carpel as in *Grevillea* and the legumes, or of several carpels each free and distinct as in *Annonaceae* and *Dilleniaceae*.
- appendage:** an outgrowth from any organ.
- appressed:** pressed closely against; adpressed.
- areole:** a space between the strands of a net or in any reticulated surface, hence areolate.
- aril:** a fleshy appendage to a seed; sometimes applied only to those which enclose the seed or are persistent, hence arillate (Fig. 1).
- aristate:** terminating with a long, fine point, often bristle-like (Fig. 80).
- Arnhem Land:** land belonging to the Arnhem Land Aboriginal Land Trust, broadly that part of the Northern Territory north of 14 degrees S latitude and east of 133 degrees E longitude.
- article:** a segment of a transversely jointed fruit (or stem), with separation occurring naturally at the joints, as in *Entada* and *Desmodium* (Figs. 11,21).
- articulate:** with joints where parts may separate naturally.
- attenuate:** tapering gradually (Fig. 80).
- auriculate:** having small ear-like lobes, usually at the base of a leaf or petal as in *Ammannia multiflora* (Fig. 41).
- axil:** the angle formed between a leaf and a branch, hence axillary.
- axile placentation:** of ovules attached to the central axis of a plurilocular ovary (Fig. 79).
- basal placentation:** of ovules attached to the base of the ovary (Fig. 79).
- basifixed:** attached at or by the base.
- berry:** a simple fruit having a pulpy or fleshy ovary wall, often many-seeded as in a tomato.
- bifid:** two lobed, divided for about half the length.
- bipinnate:** of compound leaves, where they are twice divided or with two orders of division (Figs. 1,80).
- bisexual:** of flowers possessing functional pistils and stamens.
- bract:** a modified leaf differing in size, shape or colour from the foliage leaves, usually smaller and associated with the inflorescence or flower, hence bracteate.
- bracteole:** bracts associated with the pedicel of the flower (Fig. 15).
- caducous:** falling off very early.
- callus:** pl. calli; a thickened, raised area of  $\pm$  hardened tissue (Fig. 15).
- calyx:** outer whorl of a flower with a double perianth (Fig. 1,79).
- campanulate:** bell-shaped.
- canaliculate:** longitudinally grooved or channelled.
- capitate:** clustered, compact and rounded, e.g. of flowers in an inflorescence (Figs. 1,79).
- capsule:** a dry fruit consisting of two or more fused carpels dehiscing either by valves or by pores as in *Eucalyptus* and *Denhamia* (Figs. 48,68).
- carpel:** part of an ovary or fruit; an organ with the



- ovary at the base and style and stigma at the top. Several may make up a pistil.
- caruncle:** an outgrowth of the seed coat forming a fleshy appendage at or about the hilum of a seed, cf. aril.
- caudate:** having a tail-like extension as in the pod of *Centrosema* (Fig. 18).
- cauliflorous:** bearing inflorescences on older branches or trunk.
- cauline:** of leaves born on an aerial stem.
- chartaceous:** having a papery texture.
- ciliate:** with a row of evenly spaced hairs on the margin.
- circumsciss:** opening by a transverse annular split around the circumference.
- circumtropical:** occurring around the tropics; pantropical
- cladode:** a stem which takes the function of a leaf, often flattened and green as in *Bossiaea bossiaeoides* (Fig. 17).
- clavate:** club-shaped.
- claw:** the narrowed petiole-like base of some petals or sepals, cf. limb (Fig. 15).
- climber:** a plant rooted in the ground but supported by other plants.
- coccus:** pl. cocci; a lobe or segment of a fruit, e.g. *Poranthera* (Fig. 77).
- colleter:** a minute, multicellular, glandular appendage that secretes a viscid substance.
- colliculate:** covered with small rounded projections.
- column:** a fusion of the stamens into a tube or fusion of the stamens and style into a solid body, cf. androphore.
- compound:** composed of several distinct parts, although sometimes reduced, as of a leaf (Fig. 80).
- concertina'd:** folded backwards and forwards transversely, like the folds in a concertina.
- concolorous:** of similar colour as in the two surfaces of a leaf.
- confluent:** merging or blending together.
- conical:** cone-shaped.
- connate:** of similar parts so united they can only be separated by tearing.
- connective:** tissue joining the locules of an anther to one another.
- connivent:** coming into contact, but not united.
- conspecific:** belonging to the same species.
- cordate:** heart-shaped in outline, e.g. strongly lobed leaf bases (Fig. 80).
- cordiform:** of a solid body shaped like a heart.
- coriaceous:** leathery.
- corolla:** the inner whorl of a perianth, made up of petals, usually conspicuous and showy (Fig. 1).
- corymb:** a flat-topped inflorescence, hence corymbose (Figs. 48,79).
- crenate:** of a margin with obtuse or rounded teeth; scalloped (Fig. 80).
- crenulate:** finely crenate (Fig. 80).
- crisped:** of hairs that are curled, kinked or wrinkled.
- crustaceous:** dry and brittle.
- cuboidal:** approaching the form of a cube.
- cuneate:** tapering gradually and evenly; wedge-shaped (Fig. 80).
- cupular:** cup-like.
- cyathium:** an inflorescence of unisexual flowers surrounded by a cupular involucre, as in *Euphorbia*.
- cymbiform:** boat-shaped.
- decumbent:** of branches lying on the ground but with the apex ascending.
- decurrent:** extending downwards and adnate to the adjoining part, e.g. a stipule extending downwards to form a flange along the stem as in *Crotalaria alata* (Fig. 18,80).
- decussate:** in opposite pairs with successive pairs rotated at 90 degrees to each other, thus forming 4 rows (Fig. 80).
- deflexed:** bent downwards as in pods of *Indigofera hirsuta* (Fig. 26).
- dehiscent:** splitting open at maturity to release the contents.
- deltoid:** approaching the shape of a triangle with sides of similar length (Fig. 80).
- dendritic:** with tree-like branching.
- dentate:** with pointed teeth that are perpendicular to the margin (Fig. 80).
- denticulate:** finely dentate (Fig. 80).
- diadelphous:** with the staminal filaments united into two groups as in many Fabaceae (Fig. 15); cf. monadelphous.
- dichasium:** pl dichasia; a cymose inflorescence with opposite branching below the flower that terminates each axis (Fig. 79).
- dichotomous:** forking symmetrically, into two branches (Fig. 79).
- digitate:** radiating from a common point, like the fingers of an open hand.
- digitately trifoliolate:** of a compound leaf with three leaflets arising from the same point on the rachis (Fig. 80).
- dimidiate:** divided through the middle or appearing so, as in phyllodes of *Acacia dimidiata* (Fig. 4).
- dimorphic:** having two forms.
- dioecious:** having male and female reproductive structures on separate plants.
- disc:** a band of tissue located beneath a superior ovary, on top of an inferior ovary or lining the floral

- tube, often thickened or nectar secreting.
- discoïd:** disc-shaped.
- discolorous:** of differing colours, as in the surfaces of a leaf.
- dissepiment:** a partition or septum, as in an ovary or fruit.
- distal:** remote from the place of origin or attachment.
- distichous:** of leaves arranged one above the other on the axis to form two rows (Fig. 80).
- divaricate:** spreading or diverging widely.
- domatium:** pl. domatia; a pit or hollow (often containing tufts of hairs) in the axils of veins on the undersurface of a leaf.
- dorsifixed:** affixed by the dorsal surface or back.
- dorsiventral:** with dissimilar dorsal and ventral surfaces, e.g. differing in vestiture.
- drupe:** a fruit in which the pericarp consists of three layers: (1) the epicarp or skin; (2) the mesocarp, a usually fleshy but sometimes fibrous layer; and (3) the woody endocarp or stone surrounding each seed as in mango and coconut; hence drupaceous.
- ecarunculate:** lacking a caruncle.
- eccentric:** not centred, off-centre.
- elaiosome:** an oily wart-like out-growth from the coat (testa) of a seed when confined to the base or apex; caruncle.
- eligulate:** without a ligule.
- ellipsoid:** of a solid body with an elliptic section or outline.
- elliptic:** oval in outline, widest at the centre (Fig. 80).
- emarginate:** notched at the apex (Fig. 80).
- endosperm:** the layer of a seed containing starchy or oily storage tissues.
- epicortical runners:** of mistletoes; stems with haustoria on outside of host stem.
- epigynous:** arising above the level of the ovary, cf. hypogynous, perigynous (Fig. 79).
- epipetalous:** of organs inserted upon the petals (Fig. 79).
- equitant:** of distichous leaves folded longitudinally and overlapping or astride at their bases.
- exarillate:** without an aril.
- exserted:** protruding, as are the valves of some *Eucalyptus* capsules (Fig. 48f).
- exstipulate:** without stipules.
- falcate:** sickle-shaped (Fig. 80).
- fascicle:** a close cluster or bundle as in inflorescence of *Flueggea virosa* (Fig. 73).
- ferruginous:** rust coloured, red-brown.
- filament:** stalk of stamen (Fig. 79).
- filiform:** thread-like (Fig. 80).
- fimbriate:** fringed.
- foliaceous:** leaf-like.
- follicle:** a dry fruit, dehiscing along one suture and derived from a unicarpellate, unilocular ovary, as in *Grevillea* (Fig. 34).
- free central placentation:** of ovules arranged around a central column (Fig. 79).
- free:** not fused.
- frugivorous:** fruit-eating, e.g. fruit bats, many pigeons.
- fulvous:** tawny, yellowish-brown.
- funicle:** the stalk of an ovule or seed as on seed of *Acacia auriculiformis* (Fig. 2).
- gamopetalous:** of petals partly or wholly fused.
- gamophyllous:** perianth members or sepals partly or wholly fused.
- geniculate:** with an abrupt, knee-like bend.
- glabrate:** becoming glabrous with age or nearly glabrous; glabrescent.
- glabrescent:** glabrate.
- glabrous:** without hairs.
- glaucous:** covered with a whitish bloom, giving a blue-green appearance.
- globose:** spherical.
- glomerate:** in a dense, compact cluster or clusters.
- glume:** a bract  $\pm$  enclosing a flower or spikelet, especially in Cyperaceae and Poaceae.
- gynandrous:** androecium and gynoecium fused into a single structure.
- gynobasic:** of style, arising from base instead of ovary apex, as in Lamiaceae and Boraginaceae.
- gynoecium:** seed bearing organ or organs of the flower.
- gynophore:** a stalk bearing the gynoecium of a flower.
- half inferior:** of an ovary where the perianth arises from half way up (Fig. 79).
- head:** a short, compact inflorescence of sessile or nearly sessile flowers; capitulum (Figs. 1, 79).
- hemiparasitic:** half parasitic.
- heterostylic:** of species whose flowers have two or more forms with respect to their relative stamen and style lengths.
- hilum:** the scar on a seed coat where the funicle has separated from the seed.
- hirsute:** bearing coarse, longish hairs.
- hispid:** with stiff, bristly hairs.
- hispidulous:** with short stiff, bristly hairs.
- hoary:** with a short dense indumentum giving a greyish appearance.
- hyaline:** translucent, thin.
- hypanthium:** a cup-like receptacle bearing sepals, petals, stamens and ovary (Fig. 40).
- hypogynous:** arising from below the ovary.
- imbricate:** overlapping.
- imparipinnate:** of compound leaves having an odd terminal leaflet (Fig. 80).



- indumentum:** the entire covering of hairs or other trichomes.
- indusium:** a cup-shaped or two-lipped dilatation with a narrow opening at the end of the style, enclosing the stigma as in *Goodenia*.
- inferior:** of flowers with floral members arising above the ovary (Figs. 38,79).
- inflexed:** bent inwards.
- inflorescence:** a collective term for the aggregation of flowers.
- infructescence:** a collective term for the aggregation of fruits.
- interjugary:** between successive pairs of leaflets in a pinnate leaf (cf. internodal).
- involucre:** a number of bracts surrounding a flower or group of flowers as in *Phaleria* (Fig. 42).
- jugate:** of a pinnate leaf when the leaflets are in opposite pairs or jugae, hence jugary (Fig. 1).
- keel:** of a flower of the Fabaceae, the lower petals which are  $\pm$ united along the lower margin; also a ridge along a fold such as in the glume of a grass spikelet (Fig. 15).
- Kimberley Region:** in general terms, that part of Western Australia lying north of 19 degrees S latitude.
- laciniate:** appearing cut into narrow pointed or ribbon-like segments.
- lamella:** pl. lamellae; a thin plate of tissue; gill (Fig. 15).
- lanceolate:** shaped like the head of a lance, with length to breadth of approx. 4:1; broadest in the lower half with curved sides tapering to a point (Fig. 80).
- laterite:** a  $\pm$ hard iron-rich, rock-like soil layer formed by heavy leaching of soil under markedly seasonal tropical conditions.
- latex:** the milky juice of certain plants, e.g. fig or pawpaw.
- leaf blade:** lamina; the usually broad, flattened part of a leaf (Fig. 80).
- legume:** a member of Caesalpinaceae, Fabaceae or Mimosaceae; the fruit of most members of these families (i.e. a pod).
- lenticel:** raised spongy areas found on the bark of some trees which allow gaseous exchange, hence lenticelled.
- lenticular:** biconvex; lens-like.
- lepidote:** covered with scales.
- liana:** pl. lianes; a woody perennial vine.
- ligulate:** strap-shaped.
- ligule:** particularly of grasses; a membranous or ciliate structure on the adaxial leaf surface adjacent to the sheath.
- limb:** the broad expanded part of a petal, where the base is  $\pm$ abruptly narrowed (clawed) or connate (Fig. 15).
- linear:** long and narrow with  $\pm$ parallel sides (Fig. 80).
- loculicidal:** of a mature capsule splitting along its outer locule wall.
- loculus:** pl. loculi; locule; a chamber or cavity such as those bearing ovules, or pollen (Figs. 15,79).
- lunate:** crescent-shaped.
- Malesia:** part of SE Asia, comprising Indonesia, Malaysia, Singapore, Brunei, the Philippines and Papua New Guinea.
- marginal placentation:** of ovules attached to the margin of an ovary, e.g. as in legumes (Fig. 79).
- medifixed:** attached near the middle (Fig. 79).
- membranous:** thin and translucent.
- mericarp:** a one seeded, usually indehiscent carpel separating from a schizocarp as in fruit of *Myriophyllum* (Fig. 39).
- minni ritchi:** a type of bark which is red-brown and shed in short, narrow curling strips, found on some species of *Acacia*.
- monadelphous:** having the staminal filaments united into a single set as in *Canavalia*, cf. diadelphous.
- moniliform:** cylindrical but with regular, even constrictions like a string of beads as in pods of *Sophora tomentosa* (Fig. 29).
- monochasium:** a cymose inflorescence in which the axis ends in a flower and further growth arises from a bud below the flower, cf. dichasium. When this growth pattern is repeated the inflorescence is termed a compound monochasium (Fig. 79).
- monoecious:** with male and female reproductive structures in separate flowers on the same plant.
- monospecific:** with one species, e.g. of a genus with one species.
- monotypic:** of one type, e.g. a family with one genus.
- mucro:** a sharp, abrupt terminal point, hence mucronate (Fig. 80).
- muricate:** rough with minute, short, hard projections on the surface as in seeds of *Phyllanthus minutiflorus* (Fig. 75).
- navicular:** boat-shaped, hence naviculate.
- nectary:** a nectar producing organ.
- Neotropics:** New World tropics; tropics of the Americas.
- node:** place on stem where one or more leaves or other organs arise.
- nodose:** having swollen or bulbous nodes.
- nut:** a one-seeded, indehiscent fruit with a hard dry pericarp.
- nutlet:** a small nut.



- obclavate:** club shaped and attached at the narrow end.
- obconic:** conical but attached at the narrow end.
- obcordate:** cordate but attached at the narrow end.
- obdeltoid:** deltoid but attached at the narrow end.
- oblanceolate:** lanceolate but attached at the narrow end (Fig. 80).
- obloid:** of a solid body with an oblong section or outline.
- oblong:** rectangular but with rounded ends, length to breadth ratio c. 2:1 (Fig. 80).
- obovate:** ovate but attached at the narrow end (Fig. 80).
- obovoid:** ovoid but attached at the narrow end.
- obpyriform:** pear-shaped and attached at the broad end.
- obtuse:** blunt, terminating in a broad angle (Fig. 80).
- ochrea:** sheathing leaf-base of members of Polygonaceae, possibly a pair of fused stipules.
- operculum:** a cap, e.g. in *Eucalyptus* flowers a compound structure of perianth parts (Fig. 48a).
- opposite:** where two organs arise from the same node on opposite sides of the axis (Fig. 80).
- orbicular:** circular (Fig. 80).
- ovary:** part of the gynoecium which encloses the ovules (Fig. 79).
- ovate:** egg-shaped in outline (Fig. 80).
- ovoid:** of a solid body with an ovate section or ovate in outline.
- ovule:** organ which after fertilization develops into the seed (Fig. 15).
- palmate:** divided fan-wise or like the fingers of a flattened hand (Fig. 80).
- panicle:** an inflorescence with compound branching, hence paniculate (Figs. 48, 79).
- pantropical:** occurring throughout the tropics.
- papillose:** with minute, rounded, elongated projections on the surface.
- parietal placentation:** in which two or more placentas develop on the wall of a uniloculate ovary (Fig. 79).
- paripinnate:** of compound leaves lacking a terminal leaflet (Fig. 80).
- patent:** spreading, diverging from the axis at 90 degrees.
- pectinate:** divided like a comb, into evenly spaced narrow segments.
- pedicel:** stalk of a flower (Fig. 79).
- pellucid:** translucent.
- peltate:** of a structure with axis inserted on the lower surface, e.g. of a petiole on a leaf (Fig. 80).
- penicillate:** like a tuft of hairs, as seen in *Urtica* (nettle), where the stigma consists of a number of hair-like branches.
- penninerved:** pinnately nerved.
- perennial:** with a life-span of more than one year.
- perfoliate:** of a sessile leaf or bract where the base extends around the leaf, so that the stem appears to pass through the blade.
- perianth:** the floral envelope, usually consisting of two whorls, the calyx and corolla; specifically where the segments (tepals) of the perianth are much alike but in whorls, (e.g. Euphorbiaceae, Liliaceae) or quite similar and in a single whorl, (e.g. Chenopodiaceae).
- pericarp:** the outer wall of a fruit, which develops from the wall of the ovary and composed of three layers - the exocarp, mesocarp and endocarp.
- perigynous:** when the sepals, petals, and stamens are inserted round the superior ovary on the cup-like or tubular torus or receptacle; the stamens also appear perigynous when inserted on the corolla.
- persistent:** e.g. of floral parts not shed after flowering.
- petal:** a member of the corolla (Fig. 79).
- petaloid:** having the appearance of a petal.
- petiole:** part of a leaf (the stalk) which bears a leaf blade (lamina), at the point of attachment to the branchlet usually ending in a swelling (Fig. 80).
- petiolule:** the stalk of a leaflet within a compound leaf.
- phyllanthoid:** of leaves distichous on lateral branchlets, giving the appearance of pinnate leaves.
- phyllode:** a leaf-like petiole or rachis (often broad and flattened), taking the place of leaves in most Australian species of *Acacia* (Fig. 1).
- pilose:** with soft, clearly separated but not sparse hairs.
- pinna:** pl. pinnae; the primary division of a compound leaf (Fig. 80).
- pinnate:** of a compound leaf when the leaflets are arranged along a rachis (Fig. 80).
- pinnately trifoliate:** a compound leaf with three leaflets, with the terminal leaflet on an extension of the rachis (Fig. 80).
- pistil:** the united carpels of a syncarpous gynoecium or a single carpel of an apocarpous gynoecium.
- pistillode:** a sterile pistil, often rudimentary.
- placenta:** tissue from which ovules arise.
- placentation:** arrangement and position of the placentas in the ovary (Fig. 79).
- pleiochasium:** a cyme with more than 2 lateral branches.
- plumose:** feather-like.
- plurinerved:** with several to many nerves.
- pod:** a legume; a dry fruit dehiscing by two sutures and derived from a unicarpellate, unilocular ovary; found in Caesalpiniaceae, Fabaceae and Mimosaceae (Fig. 4).

- polygamous:** bearing male, female, and bisexual flowers on the same plant.
- polypetalous:** corolla of several free petals.
- polyphyllous:** with perianth or petals and sepals arising separately from the axis.
- prickle:** a sharp outgrowth of the epidermis or bark as in *Mimosa* (Fig. 12).
- procumbent:** of branches which extend laterally and ultimately trail along the ground without rooting at the nodes.
- prostrate:** lying flat on the ground.
- puberulous:** covered with minute, soft, erect hairs.
- pubescent:** covered with short, soft, erect hairs.
- pulvinus:** the swollen base of a petiole or petiolule (Fig. 80).
- punctate:** marked with dots.
- punctulate:** marked with minute dots.
- pustulate:** with small pimple-like or blister-like projections.
- pyriform:** pear-shaped.
- quadrate:** squared in cross section.
- raceme:** an inflorescence consisting of an unbranched axis bearing stalked flowers (Figs. 1,79).
- rachilla:** pl. rachillae; the secondary axis of a compound leaf or inflorescence (Fig. 80).
- rachis:** the primary axis of a compound leaf or inflorescence (Fig. 80).
- radical:** leaves arranged in a rosette and arising apparently directly from the root.
- receptacle:** the part of the floral axis bearing the floral organs (Fig. 79).
- reflexed:** bent sharply downwards or backwards.
- reniform:** kidney-shaped (Fig. 80).
- resinous:** with resin; resin covered.
- resupinate:** upside down, twisted through 180 degrees as in standard of *Clitoria* flowers (Fig. 18).
- reticulate:** when the nerves or veins cross each other like the meshes of a net as in the leaves of *Tephrosia coriacea* (Fig. 30).
- retorse:** pointing backwards or downwards, usually of hairs.
- retuse:** of an apex which is blunt and slightly notched (Fig. 80).
- rheophyte:** a woody plant which grows primarily in seasonal water courses.
- rhizome:** an underground stem, by which a plant may reproduce vegetatively, hence rhizomatous.
- rhomboidal:** like a rhomboid (with equal, parallel sides, but two corners  $<90$  degrees and two  $>90$  degrees) (Fig. 80).
- rostellum:** the extension of the upper edge of the stigma in orchids.
- rugose:** deeply wrinkled as in seeds of *Phyllanthus lei* (Fig. 75).
- samara:** a dry indehiscent fruit with a membranous wing at one end.
- scaberulous:** finely scabrous.
- scabrous:** scabrid; rough to touch.
- scalariform:** with ladder-like markings, as in venation of *Macaranga* leaves (Fig. 74).
- scarious:** thin, dry, membranous, not green.
- schizocarp:** a dry fruit which at maturity splits into several often one-seeded portions or mericarps.
- sclerenchyma:** hard, woody tissue of cells with thickened walls, e.g. surrounding the seed in drupaceous fruit.
- secund:** with all the flowers of an inflorescence crowded to one side as in *Grevillea pteridifolia*.
- sepal:** a member of the calyx (Fig. 79).
- sepaloid:** having the appearance of sepals.
- septicidal:** of a mature capsule splitting at the junction of the septum and outer walls.
- septum:** pl. septa; a partition, hence septate.
- sericeous:** silky to touch, covered with silky hairs.
- serrate:** toothed like a saw (Fig. 80).
- serrulate:** finely serrate (Fig. 80).
- sessile:** without any stalk.
- simple:** with respect to leaves possessing a single leaf blade which may be deeply dissected but not divided into separate leaflets (Fig. 80).
- sinuate:** with smooth, regular wave-like indentations of the margin, but shallower than lobed.
- sinus:** the gap between two lobes of a leaf or other flattened organ.
- spadix:** a spike with flowers more or less sunk in tissue, usually enclosed in a spathe.
- spathe:** a large bract which sheaths an inflorescence as in Araceae, hence spathaceous and spatheate.
- spathulate:** spoon-shaped in outline (Fig. 80).
- spike:** an inflorescence consisting of an undivided floral axis, bearing sessile flowers (Figs. 1,79).
- spine:** a stiff, pointed structure derived through modification of an organ such as a stipule, branch or petiole as in *Quisqualis*.
- spinescent:** becoming spine-like.
- stamen:** pollen bearing organ, usually comprising a stalk and anther (Figs 15,79).
- staminode:** a sterile stamen, often reduced and lacking anthers.
- standard:** vexillum; the adaxial or upper petal of a flower of the Fabaceae, usually the largest petal (Fig. 15).
- stellate:** star-shaped.
- stigma:** the area receptive to pollen at or near the distal end of the style (Fig. 79).
- stipe:** a stalk, hence stipitate.

**stipel:** pl. stipellae; a small appendage growing at the base of the leaf-stalk (petiolule) in a compound leaf (Fig. 80).

**stipules:** two small appendages growing at the base of the leaf-stalk or petiole (Fig. 80).

**stolon:** an above ground stem, either prostrate or arched, which produces roots and shoots at the nodes.

**stramineous:** straw-coloured.

**striae:** striations; fine, parallel, longitudinal markings or grooves, hence striate.

**strigose:** of indumentum or hairs that are coarse and more or less straight.

**style:** that part of the gynoecium connecting the stigma with the ovary (Figs. 15,79).

**subglaucous:** barely glaucous.

**suborbicular:** almost round.

**subulate:** awl-shaped; tapering very gradually from base to apex and often sharply-pointed, but not as fine as a needle (Fig. 80).

**suburceolate:** nearly urn-shaped.

**succulent:** fleshy in texture.

**suffruticose:** of a plant with woody stem-bases and herbaceous apical portions.

**superior:** of flowers with floral members arising below the ovary (Fig. 79).

**sympodial:** of branching, where the growing point ceases to be active and growth is continued by one (or more) axillary shoots, as in *Terminalia* and *Vavaea*.

**syncarpous:** an ovary, pistil, or fruit composed of two or more united carpels.

**syngenesious:** fused to one another as with the anthers of the Asteraceae.

**tendrils:** filiform organs by which climbing plants cling to some object within reach, arising by modification of stipules, leaves or branches.

**tepal:** part of a perianth where these are similar in size, form and coloration.

**terete:** cylindrical but circular in cross-section.

**terminal:** at the apex.

**tetradynamous:** with six stamens, two outer shorter than four inner, as in Brassicaceae.

**thorn:** a spine.

**tomentellous:** of hairs when minutely tomentose.

**tomentose:** of hairs when they are closely matted and short.

**tomentum:** an indumentum of closely matted short hairs.

**torulose:** with irregular swellings at close intervals; cylindrical but the diameter varying regularly; moniliform, as in pods of *Acacia torulosa* (Fig. 10).

**torus:** part of floral axis from which arise the sepals, petals, stamens and pistil; receptacle.

**trailing:** with long prostrate stems.

**tremelloid:** jelly-like or gelatinous.

**trichome:** a general term for an epidermal outgrowth, including hairs, bristles, colletes, papillae and scales.

**triquetrous:** 3-angled, the angles usually sharp; having three acute angles with 3 concave faces.

**truncate:** ending abruptly, as though cut off (Fig. 80).

**tuber:** a storage organ formed by the swelling of an underground root or stem.

**tubercule:** a small rounded protuberance.

**turbinate:** top-shaped, obconical.

**turgid:** swollen.

**twiner:** a plant rooted in the ground and climbing primarily by twisting of the stem apices.

**umbel:** inflorescence where the divergent branches or rays start from the same point; in a simple umbel each ray bears one flower (Figs 48,79).

**umbelliform:** like an umbel.

**umbo:** a boss; rounded with a projecting point in the centre; a small conical projection from the surface.

**unifoliolate:** of a compound leaf with a rachis and one leaflet (Fig. 80).

**unilocular:** with a single cavity, as of the ovary.

**unisexual:** flowers with pistils or stamens only.

**united:** joined together, in whole or in part.

**valvate:** with the edges meeting but not overlapping.

**velutinous:** velvety; dense, soft nearly erect hairs.

**venation:** the disposition of veins, especially in a leaf.

**vernicoose:** varnished.

**verrucose:** warty.

**versatile:** attached so as to allow free movement (Fig. 79).

**vesicular:** bladder-like.

**vestiture:** a covering, usually hairs in the collective sense.

**villous:** long, soft, more or less erect hairs, moderately dense.

**viscid:** sticky.

**whorl:** where three or more organs arise from the same node (Fig. 80).

**wing:** the lateral petals of a flower of the Fabaceae which lie alongside the keel (Fig. 15).

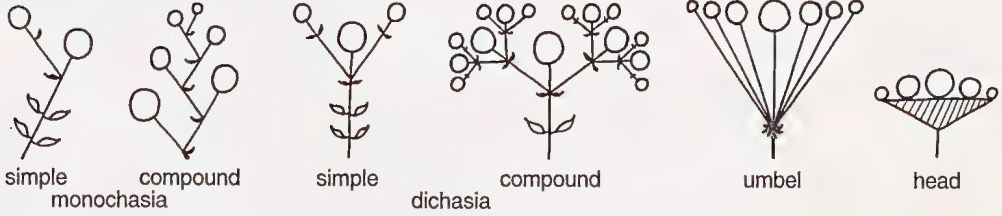
**zygomorphic:** with a single lateral plane of symmetry, especially in reference to the corolla, as in flowers of Fabaceae.



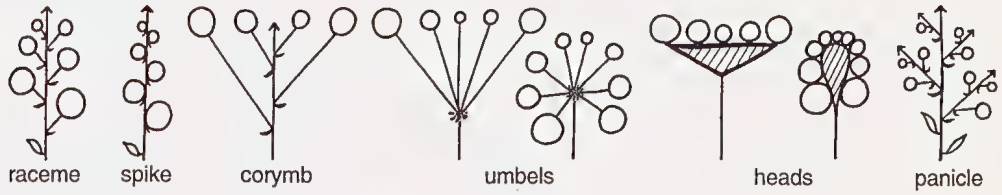
# ILLUSTRATIONS OF BOTANICAL TERMS

## INFLORESCENCES:

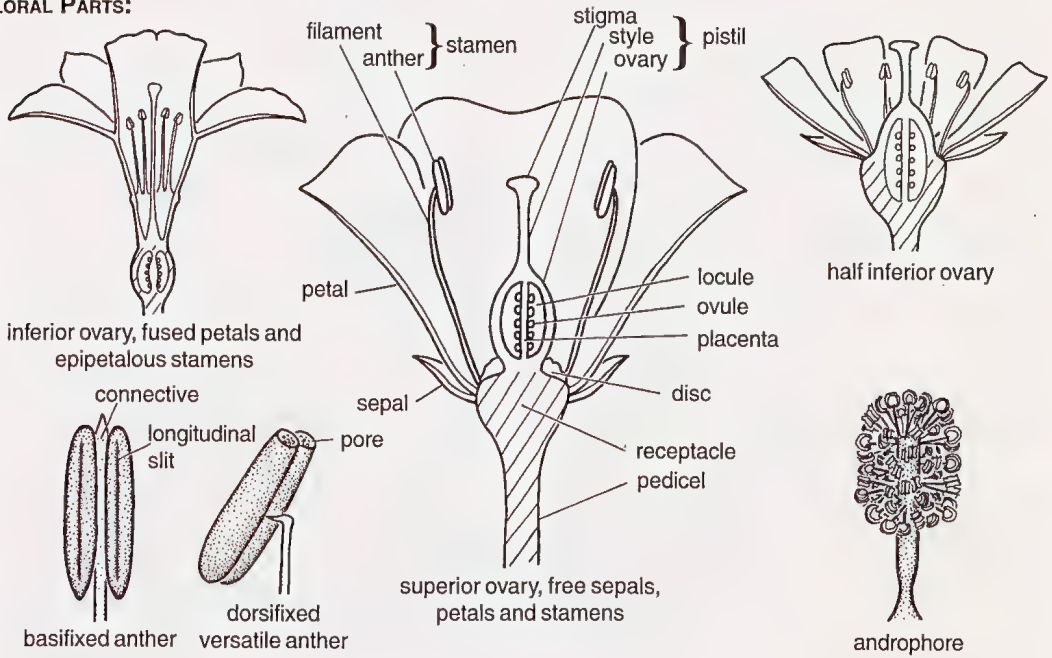
### determinant growth:



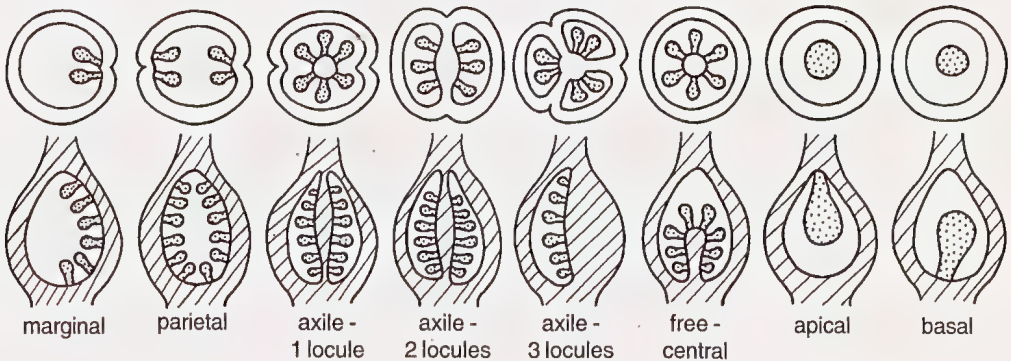
### indeterminant growth:



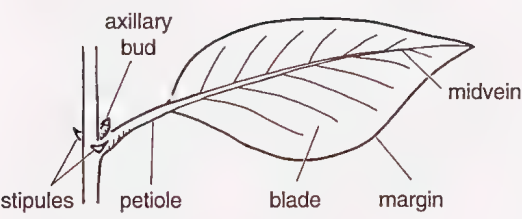
## FLORAL PARTS:



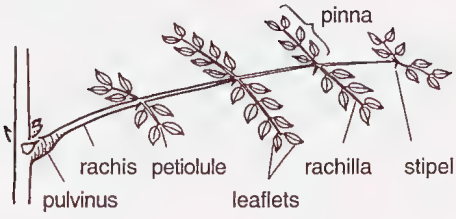
## PLACENTATION:



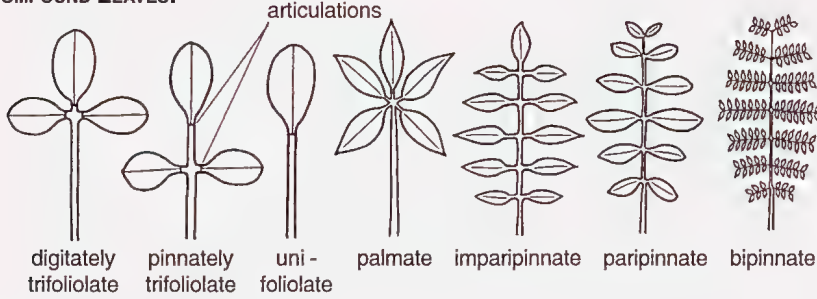
**SIMPLE LEAF:**



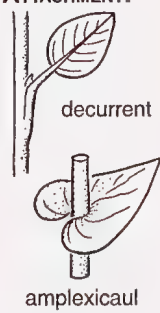
**COMPOUND LEAF:**



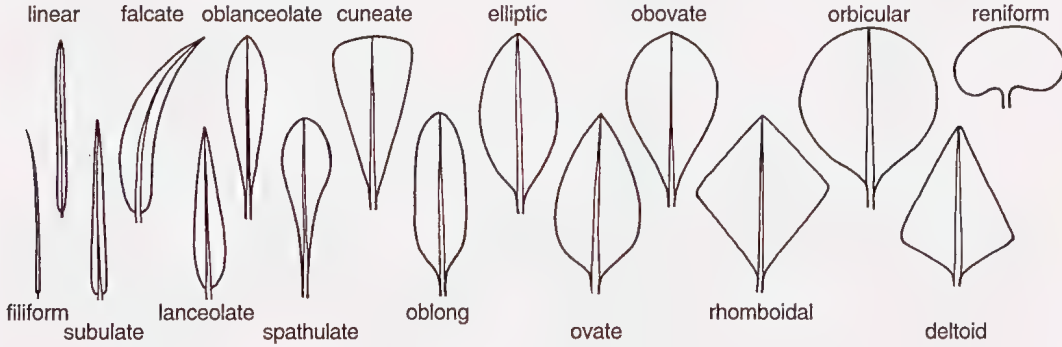
**COMPOUND LEAVES:**



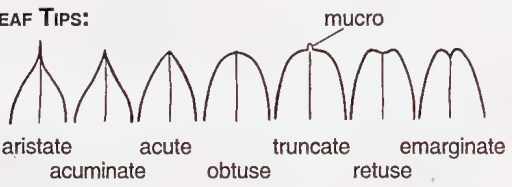
**ATTACHMENT:**



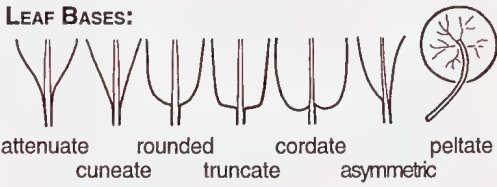
**LEAF SHAPES:**



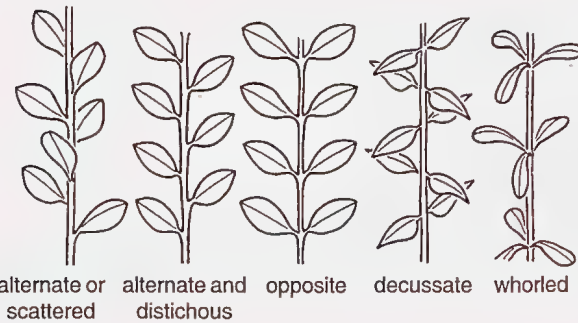
**LEAF TIPS:**



**LEAF BASES:**



**LEAF ARRANGEMENTS:**



**LEAF MARGINS:**

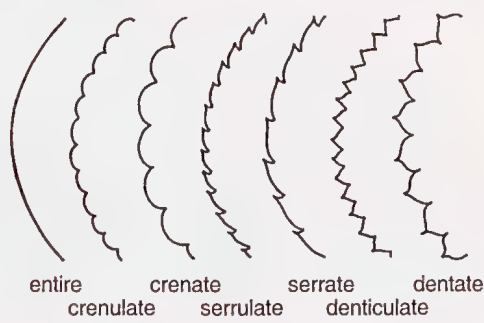


Fig. 80

## REFERENCES

- Aboriginal Communities of the Northern Territory (1988) **Traditional Bush Medicines, An Aboriginal Pharmacopoeia**. 256pp. (Melbourne: Greenhouse).
- Aboriginal Communities of the Northern Territory (1993) **Traditional Bush Medicines**. 650pp. (Darwin: Conservation Commission of the Northern Territory).
- Airy Shaw, H.K. (1976) New or noteworthy Australian Euphorbiaceae. *Kew Bulletin* 31: 341-398.
- Airy Shaw, H.K. (1980a) A partial synopsis of the Euphorbiaceae-Platylobeae of Australia (excluding *Phyllanthus*, *Euphorbia* and *Calycopeplus*). *Kew Bulletin* 35: 577-700.
- Airy Shaw, H.K. (1980b) New or noteworthy Australian Euphorbiaceae - II. *Muelleria* 4: 207-242.
- Altman, J.C. (1984) The dietary utilisation of flora and fauna by contemporary hunter-gatherers at Momega Outstation, north-central Arnhem Land. *Australian Aboriginal Studies* 1: 35-46.
- Backer, C.A. & Bakhuizen van den Brink, R.C. (1963) Euphorbiaceae. *Flora of Java* 1: 441-505.
- Backer, C.A. & van Steenis, C.G.G.J (1951) Sonneratiaceae. *Flora Malesiana* I, 4: 280-289.
- Ballment, E.R., Smith T.J. & Stoddart, J.A. (1988) Sibling species in the mangrove genus *Ceriops* (Rhizophoraceae), detected using biochemical genetics. *Australian Systematic Botany* 1: 391-398.
- Barker, W.R. (1981) Stackhousiaceae. *Handbooks of the Flora of Papua New Guinea* 2: 255-257.
- Barker, W.R. (1984) Stackhousiaceae. *Flora of Australia* 22: 186-199.
- Barlow, B.A. (1966) A revision of the Loranthaceae of Australia and New Zealand. *Australian Journal of Botany* 14: 421-500.
- Barlow, B.A. (1981) Loranthaceae. *Handbooks of the Flora of Papua New Guinea* 2: 206-254.
- Barlow, B.A. (1982) Supplement to a revision of the Loranthaceae of Australia. *Brunonia* 5: 203-212.
- Barlow, B.A. (1983) A revision of the Viscaceae of Australia. *Brunonia* 6: 25-57.
- Barlow, B.A. (1984a) Loranthaceae. *Flora of Australia* 22: 68-131.
- Barlow, B.A. (1984b) Viscaceae. *Flora of Australia* 22: 131-145.
- Barlow, B.A. (1987) Contributions to a revision of *Melaleuca* (Myrtaceae) 1-3. *Brunonia* 9: 163-177.
- Barlow, B.A. (1992) Conspectus of the genus *Amyema* Tieghem (Loranthaceae). *Blumea* 36: 293-381.
- Barlow, B.A. & Cowley, K.J. (1988) Contributions to a revision of *Melaleuca* (Myrtaceae): 4-6. *Australian Systematic Botany* 1: 95-126.
- Bean, A.R. (1992) The genus *Leptospermum* Forst. et Forst.f. (Myrtaceae) in northern Australia and Malesia. *Austrobaileya* 3: 643-659.
- Bentham, G. (1864) Leguminosae. *Flora Australiensis* 2: 1-425.



- Blake, S.T. (1953) Botanical contributions of the Northern Australian Regional Survey 1. Studies on northern Australian species of *Eucalyptus*. *Australian Journal of Botany* 1: 185-352.
- Blake, S.T. (1954) Botanical contributions of the Northern Australia Regional Survey II. Studies on miscellaneous northern Australian plants. *Australian Journal of Botany* 2: 99-140.
- Blake, S.T. (1968) A revision of *Melaleuca leucadendron* and its allies (Myrtaceae). *Contributions from the Queensland Herbarium* 1: 1-114.
- Bosman, M.T.M. & Haas, A.J.P. de (1983) A revision of the genus *Tephrosia* (Leguminosae - Papilionoideae) in Malesia. *Blumea* 28: 421-487.
- Brenan, J.P.M. (1967) Leguminosae (Part 2): Caesalpinoideae. *Flora of Tropical East Africa*. pp. 1-230.
- Brummitt, R.K. (1970) Notes on two south-east Asian species of Leguminosae, *Cathormion umbellatum* and *Pericopsis mooniana*. *Kew Bulletin* 24: 231-234.
- Burbidge, N.T. (1965) The Australian species of *Sesbania* Scopoli (Leguminosae). *Australian Journal of Botany* 13: 103-142.
- Burkill, I.H. (1966) **A Dictionary of the Economic Products of the Malay Peninsula**. 2 vols, 2444pp. (Kuala Lumpur: Ministry of Agriculture & Co-operatives).
- Byrnes, N.B. (1977a) A revision of Combretaceae in Australia. *Contributions from the Queensland Herbarium* 20: 1-72.
- Byrnes, N.B. (1977b) The genus *Verticordia* (Myrtaceae) in northern Australia. *Austrobaileya* 1: 47-48.
- Byrnes, N.B. (1984) A revision of *Melaleuca* L. (Myrtaceae) in northern and eastern Australia, 1. *Austrobaileya* 2: 65-76.
- Cameron, A.G., Miller, I.L., Harrison, P.G. & Fritz, R.J. (1984) A review of pasture plant introduction in the 600-1500 mm rainfall zone of the Northern Territory. Northern Territory Department of Primary Production *Technical Bulletin* 71: 1-81.
- Carr, S.G.M. (1972) Problems of the geography of the tropical eucalypts. In D. Walker (Ed.), **Bridge and Barrier: The Natural and Cultural History of Torres Strait**. p. 153-182. (Canberra: Australian National University Press).
- Chippendale, G.M. (1988) *Eucalyptus, Angophora* (Myrtaceae). *Flora of Australia* 19: 1-540.
- Clifford, H.T. & Cowie, I.D. (1992) Northern Territory flowering plants: A key to families. *Northern Territory Botanical Bulletin* 12: 1-92.
- Coode, M.J.E. (1973) Notes on *Terminalia* L. (Combretaceae) in Papuasias. *Contributions from Herbarium Australiense* 2: 1-33.
- Cousins, S.N. (1989) Checklist of vascular plants of the Darwin region, Northern Territory, Australia. *Northern Territory Botanical Bulletin* 8: 1-54.
- Cowley, K.J., Quinn, F.C., Barlow, B.A. & Craven, L.A. (1990) Contributions to a revision of *Melaleuca* (Myrtaceae): 7-10. *Australian Systematic Botany* 3: 165-202.
- Craven, L.A. (1980) A review of the genus *Calytrix* Labill. (Myrtaceae) in northern Australia. *Brunonia* 3: 217-246.

- Craven, L.A. (1987) A taxonomic revision of *Calytrix* Labill. (Myrtaceae). *Brunonia* 10: 1-138.
- Craven, L.A. (1989) Reinstatement and revision of *Asteromyrtus* (Myrtaceae). *Australian Systematic Botany* 1: 373-385.
- Craven, L.A. (1990) Three additional species in *Calytrix* (including the reduction of *Calythropsis*), and notes on *Calytrix extipulata* (Myrtaceae). *Australian Systematic Botany* 3: 719-725.
- Cronquist, A. (1981) **An Integrated System of Classification of Flowering Plants**. 1262pp. (New York: Columbia University Press).
- Dawson, J.W. (1972) Pacific Capsular Myrtaceae 4. The *Metrosideros* Complex: *Xanthostemon*, *Nani*, *Pleurocalyptus*, *Purpureostemon*. *Blumea* 20: 315-322.
- Ding Hou (1958) Rhizophoraceae. *Flora Malesiana* 1, 5: 429-493.
- Ding Hou (1960) A review of the genus *Rhizophora* with special reference to the Pacific species. *Blumea* 10: 625-634.
- Domin, K. (1926) Beitrage zur Flora und Pflanzengeographie Australiens. *Bibliotheca Botanica* 22(89): 741-840.
- Duke, N.C. & Bunt, J.S. (1979) The genus *Rhizophora* (Rhizophoraceae) in north-eastern Australia. *Australian Journal of Botany* 27: 657-678.
- Duke, N.C. & Jackes, B.R. (1987) A systematic revision of the mangrove genus *Sonneratia* (Sonneratiaceae) in Australasia. *Blumea* 32: 277-302.
- Everist, S.L. (1979) **Poisonous Plants of Australia**. 966pp. (2nd edn). (Sydney: Angus & Robertson).
- Foreman, D.B. (1983) A review of the genus *Helicia* Lour. (Proteaceae) in Australia. *Brunonia* 6: 59-72.
- Gardner, C. & James, T.A. (1991) *Rhynchosia*. *Flora of New South Wales* 2: 424-425.
- George, A.S. (1984) Olacaceae. *Flora of Australia* 22: 13-25.
- George, A.S. (1981) The genus *Banksia* L.f. (Proteaceae). *Nuytsia* 3: 239-473.
- George, A.S. (undated) **The Banksia Book**. 240pp. (Sydney: Kangaroo Press).
- Gillett, J.B., Polhill, R.M. & Verdcourt, B. (1971) Leguminosae (Parts 3 & 4): Papilionoideae. *Flora of Tropical East Africa* pp. 1-1108.
- Hearne, D.A. (1975) **Trees for Darwin and Northern Australia**. 130 pp. (Canberra: Australian Government Publishing Service).
- Hewson, H.J. (1990) Sonneratiaceae. *Flora of Australia* 18: 87-91.
- Hewson, H.J. & Beesley, P.L. (1990) Lythraceae. *Flora of Australia* 18: 91-113.
- Hewson, H.J. & George, A.S. (1984) Santalaceae. *Flora of Australia* 22: 29-67.
- Hiepko, P. (1984) Opiliaceae. *Flora of Australia* 22: 26-29.
- Hooker, J.D. (1885) Euphorbiaceae. *Flora of British India* 5: 239-477.

- House, A.P.N. & Harwood, C.E. (Eds). (1992) **Australian Dry-zone Acacias for Human Food**. 145pp. (Canberra: Commonwealth Scientific & Industrial Research Organisation).
- Hutchinson, J. (1967) **The Genera of Flowering Plants**. 2 vols, 659pp. (Oxford: Oxford University Press).
- Hyland, B.P.M. (1983) A revision of *Syzygium* and allied genera (Myrtaceae) in Australia. *Australian Journal of Botany* Suppl. Ser. 9: 1-164.
- Jessop, J.P. (Ed.) (1981) **Flora of Central Australia**. 537pp. (Sydney: Reed).
- Jessup, L.W. (1984a) Celastraceae. *Flora of Australia* 22: 150-180.
- Jessup, L.W. (1984b) Hippocrateaceae. *Flora of Australia* 22: 180-185.
- Johnson, L.A.S. & Briggs, B.G. (1975) On the Proteaceae - The evolution and classification of a southern family. *Botanical Journal of the Linnean Society* 70: 83-182.
- Johnson, L.A.S. & Briggs, B.G. (1983) Myrtaceae. In B.D. Morley & H.R. Toelken (Eds) **Flowering Plants in Australia**. p. 175-185. (Adelaide: Rigby).
- Johnson, L.A.S. & Briggs, B.G. (1984) Myrtales and Myrtaceae - A phylogenetic analysis. *Annals of the Missouri Botanical Garden* 71: 700-756.
- Kay, D.E. (1979) **Food Legumes**. 435pp. (London: Tropical Products Institute).
- Lacey, C.J. (1974) Rhizomes in tropical eucalypts and their role in recovery from fire damage. *Australian Journal of Botany* 22: 29-38.
- Lacey, C.J. & Whelan P.I. (1976) Observations on the ecological significance of vegetative reproduction in the Katherine - Darwin region of the Northern Territory. *Australian Forestry* 39: 131-139.
- Lee, A.T. (1978) Some species of *Crotalaria* in Australia. *Telopea* 1: 319-356.
- Levitt, D. (1981) **Plants and People: Aboriginal Uses of Plants on Groote Eylandt**. 166pp. (Canberra: Australian Institute of Aboriginal Studies).
- Mabberley, D.J. (1990) **The Plant Book**. 707pp. (Cambridge: Cambridge University Press).
- Macknight, C.C. (1976) **The Voyage to Marege?**. 175pp. (Melbourne: Melbourne University Press).
- Macmillan, H.F. (1956) **Tropical Planting and Gardening**. (5th ed.) 560pp. (London: Macmillan).
- Macmillan, H.F. (1991) **Tropical Planting and Gardening**. (6th ed.) 767pp. (Kuala Lumpur: Malayan Nature Society).
- Maesen, L.J.G. van der (1985) *Cajanus* DC. and *Atylosia* W.& A. (Leguminosae). *Agricultural University Wageningen Papers* 85(4): 3-225.
- Maslin, B.R. (1989) Wattle become of *Acacia*. *Australian Systematic Botany Society Newsletter* (58): 1-12.
- Maslin, B.R. & Thomson, L.A.J. (1992) Re-appraisal of the taxonomy of *Acacia holosericea*, including the description of a new species, *A. colei*, and the reinstatement of *A. neurocarpa*. *Australian Systematic Botany* 5: 729-743.
- McCusker, A. (1984) Rhizophoraceae. *Flora of Australia* 22: 1-10.



- McGillivray, D.J. (1993) **Grevillea**. 465pp. (Melbourne: Melbourne University Press).
- Miller, J.B., James, K.W. & Maggiore, P.M.A. (1993) **Tables of Composition of Australian Aboriginal Foods**. 256pp. (Canberra: Aboriginal Studies Press).
- Morley, B.D. & Toelken, H.R. (Eds) (1983) **Flowering Plants in Australia**. 416pp. (Adelaide: Rigby).
- National Academy of Sciences (1979) **Tropical Legumes: Resources for the Future**. 331pp. (Washington: National Academy of Sciences).
- New, T.R. (1984) **A Biology of Acacias**. 153pp. (Melbourne: Oxford University Press).
- Nielsen, I.C. & Hopkins, H.C.F. (1992) Mimosaceae (Leguminosae - Mimosoideae). *Flora Malesiana* 1, 11: 1-226.
- O'Connell, J.F., Latz, P.K. & Barnett, P. (1983) Traditional and modern plant use among the Alyawara of Central Australia. *Economic Botany* 37: 80-109.
- Orchard, A.E. (1990) Haloragaceae. *Flora of Australia* 18: 5-85.
- Pedley, L. (1978) A revision of *Acacia* Mill. in Queensland. Part 1. *Austrobaileya* 1: 75-234.
- Pedley, L. (1984) Aquifoliaceae. *Flora of Australia* 22: 199-204.
- Pedley, L. (1986) Derivation and dispersal of *Acacia* (Leguminosae) with particular reference to Australia, and the recognition of *Senegalia* and *Racosperma*. *Botanical Journal of the Linnean Society* 92: 219-254.
- Pedley, L. (1989) *Racosperma* again. *Australian Systematic Botany Society Newsletter* 59: 1-2.
- Pedley, L. (1990) Combretaceae. *Flora of Australia* 18: 255-293.
- Pinyopusarerk, K. (1990) ***Acacia auriculiformis*: an Annotated Bibliography**. 14pp. (Canberra: Australian Centre for International Agricultural Research).
- Polhill, R.M. (1982) **Crotalaria in Africa and Madagascar**. 389pp. (Rotterdam: Balkema).
- Polhill, R.M. & Raven, P.H. (Eds) (1981) **Advances in Legume Systematics**. 2 vols, 1050pp. (London: Royal Botanic Gardens).
- Pryor, L.D. & Johnson, L.A.S. (1971) **A Classification of the Eucalypts**. 102pp. (Canberra: Australian National University Press).
- Purseglove, J.W. (1969) **Tropical Crops: Dicotyledons**. 2 vols, 719pp. (London: Longmans).
- Randell, B.R. (1988) Revision of the Cassiinae in Australia. 1. *Senna* Miller Sect. *Chamaefistula* (Colladon) Irwin and Barneby. *Journal of the Adelaide Botanic Gardens* 11: 19-49.
- Randell, B.R. (1989) Revision of the Cassiinae in Australia. 2. *Senna* Miller Sect. *Psilorhegma* (J. Vogel) Irwin and Barneby. *Journal of the Adelaide Botanic Gardens* 12: 165-270.
- Randell, B.R. (1990) Revision of the Cassiinae in Australia. 3. *Senna* Miller Sect. *Senna*. *Journal of the Adelaide Botanic Gardens* 13: 1-16.
- Reynolds, S.T. (1990) *Aeschynomeneae* (Benth.) Hutch. (Leguminosae) in Australia. *Austrobaileya* 3: 177-202.

- Reynolds, S.T. & Holland, A.E. (1989) The Genus *Zornia* J. Gmelin (Leguminosae) in Australia. *Austrobaileya* 3: 13-38.
- Reynolds, S.T. & Pedley, L. (1981) A revision of *Atylosia* (Leguminosae) in Australia. *Austrobaileya* 1: 420-428.
- Russell-Smith, J.R. (1985) Studies in the jungle: people, fire and monsoon forest. In R. Jones (Ed.) **Archaeological Research in Kakadu National Park**. p. 241-263. (Canberra: Australian National Parks & Wildlife Service).
- Rye, B.L. & Heads, M.J. (1990) Thymelaeaceae. *Flora of Australia* 18: 122-215.
- Saxon, E.C. (1981) Tuberous legumes: preliminary evaluation of tropical Australian and introduced species as fuel crops. *Economic Botany* 35: 163-173.
- Scarlett, N., White, N. & Reid, J. (1982) "Bush Medicines": The Pharmacopoeia of the Yolngu of Arnhem Land. In J. Reid (Ed.), **Body, Land and Spirit**. p. 154-191. (St. Lucia: Queensland University Press).
- Schaeffer, J. (1971) Revision of the genus *Endospermum* Benth. (Euphorbiaceae). *Blumea* 19: 171-192.
- Scholefield, P.B. (1984) Euphorbiaceae. In P.E. Page (Ed.), **Tropical Tree Fruits for Australia**. p. 61-62. (Brisbane: Queensland Dept. of Primary Industry).
- Schrire, B.D. (1992) New combinations and resurrected names in *Microcharis* and *Indigastrum* (Fabaceae: Papilionoideae). *Bothalia* 22: 165-170.
- Scott, A.J. (1978) A new species of *Myrtella* (Myrtaceae) from Australia and a synopsis of the genus. *Kew Bulletin* 33: 299-302.
- Scott, A.J. (1979) A Revision of *Rhodamnia* (Myrtaceae). *Kew Bulletin* 33: 429-459.
- Skerman, P.J., Cameron, D.G. & Riveros, F. (1988) **Tropical Forage Legumes**. 692pp. (Rome: Food & Agriculture Organisation).
- Smith, N., Wididburu, B., Harrington, R.N. & Wightman, G. (1993) Ngarinyman ethnobotany, Aboriginal plant use from the Victoria River area, Northern Australia. *Northern Territory Botanical Bulletin* 16: 1-64.
- Smith, N. & Wightman, G.M. (1990) Ethnobotanical notes from Belyuen, Northern Territory, Australia. *Northern Territory Botanical Bulletin* 10: 1-31.
- Specht, R.L. (1958). An introduction to the ethno-botany of Arnhem Land. In Specht, R.L. & Mountford, C.P. (Eds). **Records of the American - Australian Scientific Expedition to Arnhem Land, 3**. (Melbourne: Melbourne University Press).
- Stanley, T.D. (1983) Fabaceae. *Flora of south-eastern Queensland* 1: 239-331.
- Taylor, A. & Hopper, S.D. (1988) The Banksia Atlas. *Australian Flora and Fauna Series* 8: 1-257.
- Thompson, J. (1989) A revision of the genus *Leptospermum* (Myrtaceae). *Telopea* 3: 301-448.
- Thompson, J. (1990) Onagraceae. *Flora of Australia* 18: 215-243.
- Tindale, M.D. & Craven, L.A. (1988) Three new species of *Glycine* (Fabaceae: Phaseolae) from north-western Australia, with notes on amphicarpy in the genus. *Australian Systematic Botany* 1: 399-410.

- Turnbull, J.W. (Ed.) (1986) **Multipurpose Australian Trees and Shrubs**. 316pp. (Canberra: Australian Centre for International Agricultural Research).
- Verdcourt, B. (1970) Studies in the Leguminosae-Papilionoideae for the 'Flora of Tropical East Africa': III. *Kew Bulletin* 24: 379-447.
- Verdcourt, B. (1979) A manual of New Guinea legumes. *Botany Bulletin* 11: 1-645.
- Wagner, W.L., Herbst, D.R. & Sohmer, S.H. (Eds) (1990) **Manual of the Flowering Plants of Hawai'i** 2 vols, 1853pp. (Honolulu: Bishop Museum Press).
- Webster, G.L. (1984) A revision of *Flueggea* (Euphorbiaceae) *Allertonia* 3: 259-312.
- Webster, G.L. (1994) Synopsis of the genera and suprageneric taxa of Euphorbiaceae. *Annals of the Missouri Botanical Garden* 81: 33-144.
- Webster, G.L. & Airy Shaw, H.K. (1971) A provisional synopsis of the New Guinea taxa of *Phyllanthus* (Euphorbiaceae). *Kew Bulletin* 26: 85-109.
- Wheeler, J.R. (Ed.) (1992) **Flora of the Kimberley Region**. 1327pp. (Perth: Department of Conservation and Land Management).
- Whiffin, T. (1990) Melastomataceae. *Flora of Australia* 18: 243-255.
- Wightman, G.M. (1989) Mangroves of the Northern Territory. *Northern Territory Botanical Bulletin* 7: 1-130.
- Wightman, G.M. & Brown, J. (1994) **Jawoyn Plant Identikit**. 65pp. (Darwin: Conservation Commission of the Northern Territory).
- Wightman, G.M., Dixon, D., Williams, L. & Dalywaters, I. (1992) Mudburra ethnobotany, Aboriginal plant use from Kulumindini (Elliott) Northern Australia. *Northern Territory Botanical Bulletin* 14: 1-44.
- Wightman, G.M., Jackson, D. & Williams, L. (1991) Alawa ethnobotany, Aboriginal plant use from Minyerri, Northern Australia. *Northern Territory Botanical Bulletin* 11: 1-36.
- Wightman, G.M., Roberts, J.G. & Williams, L. (1992) Mangarrayi ethnobotany, Aboriginal plant use from the Elsey area, Northern Australia. *Northern Territory Botanical Bulletin* 15: 1-59.
- Wightman, G.M. & Smith, N.M. (1989) Ethnobotany, vegetation and floristics of Milingimbi, Northern Australia. *Northern Territory Botanical Bulletin* 6: 1-37.
- Wilmot-Dear, C.M. (1987) *Croton armstrongii* and *C. habrophyllus* (Euphorbiaceae): A confusion. *Kew Bulletin* 42: 661-662.
- Wilson, P.G. (1987) Taxonomic notes on some Australian species of *Indigofera* (Fabaceae - Faboideae). *Journal of the Adelaide Botanic Gardens* 10: 119-126.
- Wilson, P.G. (1990) A revision of the genus *Xanthostemon* (Myrtaceae) in Australia. *Telopea* 3: 451-476.
- Wilson, P.G. & Waterhouse, J.T. (1982) A review of the genus *Tristania* R.Br. (Myrtaceae), a heterogeneous assemblage of five genera. *Australian Journal of Botany* 30: 413-446.
- Windler, D.R. (1966) A revision of the genus *Neptunia* (Leguminosae). *Australian Journal of Botany* 14: 379-420.
- Wit, H.C.D. de (1956) A revision of Malaysian Bauhinieae. *Reinwardtia* 3: 381-539.



## INDEX

- Abrus** ..... 46  
**Abrus precatorius** ..... 46, 48  
**Acacia** ..... 1  
    *alleniana* ..... 4, 6, 7  
    *aulocarpa* ..... 4, 6, 7  
    *auriculiformis* ..... 4, 6, 7  
    *bossiaeioides* ..... 51  
    'calcigera' ..... 17  
    *catechu* var. *sundra* ..... 2, 7, 8  
    *colei* ..... 11  
    *conspersa* ..... 4, 7, 8  
    *difficilis* ..... 4, 7, 8  
    *dimidiata* ..... 4, 8, 10  
    *ditricha* ..... 20  
    'Douglas R.' ..... 2, 10, 20  
    *dunnii* ..... 9, 10  
    *farnesiana* ..... 2, 9, 9  
    *gonocarpa* ..... 4, 9, 10  
    *helicophylla* ..... 4, 11, 12  
    *hemignosta* ..... 4, 11, 12  
    *holosericea* ..... 4, 11, 12  
    *humifusa* ..... 4, 12, 13  
    *latescens* ..... 4, 12, 13  
    *leptocarpa* ..... 4, 12, 13  
    *mangium* ..... 13, 14  
    *mimula* ..... 4, 13, 15  
    *mountfordiae* ..... 14, 15  
    *multisiliqua* ..... 4, 14, 15  
    *neurocarpa* ..... 11  
    *nuperrima* ..... 4, 14, 15  
    *oligoneura* ..... 4, 16, 16  
    *oncinocarpa* ..... 4, 15, 16  
    *pachyphloia* ..... 2, 15, 17  
    *pallidifolia* ..... 2, 17, 18  
    *pellita* ..... 4, 17, 18  
    *platycarpa* ..... 4, 17, 18  
    *plectocarpa* ..... 4, 18, 19  
    *praelongata* ..... 4, 18, 19  
    *praetermissa* ..... 4, 18, 19  
    *tolmerensis* ..... 4, 19, 21  
    *torulosa* ..... 4, 20, 21  
    *umbellata* ..... 4, 20, 21  
**Acalypha** ..... 206  
**Acmena** ..... 151  
    *hemilampra* subsp. *hemilampra* ..... 151, 153  
**Acmenosperma** ..... 151  
    *claviiflorum* ..... 151, 153  
**Adenanthera** ..... 20  
    *pavonina* ..... 20, 21  
**Aeschynomene** ..... 46  
    *americana* ..... 46, 48  
    *aspera* ..... 47, 48  
    *indica* ..... 47, 48  
    *villosa* ..... 47, 48  
**Albizia** ..... 22  
    *canescens* ..... 22, 24  
    *lebbeck* ..... 22, 24  
**Alysicarpus** ..... 48  
    *campylocaulis* ..... 70  
    *glumaceus* ..... 48, 49  
    *longifolius* ..... 48, 49  
    *ovalifolius* ..... 50  
    *rugosus* ..... 48, 49  
    *schomburgkii* ..... 49  
    *vaginalis* ..... 48, 50  
**Ammannia** ..... 132  
    *auriculata* ..... 133  
    *baccifera* ..... 133, 134  
    *multiflora* ..... 133, 134  
**Amyema** ..... 195  
    *benthamii* ..... 195, 196, 199  
    *bifurcata* ..... 195  
    *bifurcata* var. *bifurcata* ..... 196, 199  
    *conspicua* ..... 195  
    *conspicua* subsp. *obscurinervis* ..... 196, 199  
    *haematodes* ..... 195, 196, 199  
    *mackayensis* ..... 195  
    *mackayensis* subsp. *cycnei-sinus* ..... 197, 199  
    *miquelii* ..... 195, 197, 199  
    *sanguinea* ..... 195, 197, 199  
    *sanguinea* var. *pulchra* ..... 197  
    *thalassia* ..... 195, 197, 199  
    *villiflora* ..... 195, 197, 199  
    *villiflora* subsp. *tomentilla* ..... 197  
**Anthobolus** ..... 192  
    *filifolius* ..... 192, 193  
**Antidesma** ..... 207  
    *ghesaembilla* ..... 208, 211  
    *parvifolium* ..... 208, 211  
**AQUIFOLIACEAE** ..... 205  
**Asteromyrtus** ..... 152  
    *symphyocarpa* ..... 152, 153  
**Atylosia** ..... 51  
    *grandifolia* ..... 52  
    *marmorata* ..... 52  
    *scarabaeoides* var. *pedunculata* ..... 53  
**Austrodolichos** ..... 50  
    *errabundus* ..... 50, 54  
    'Kakadu' ..... 51, 54  
**Banksia** ..... 119  
    *dentata* ..... 118, 119, 121  
**Bat's Wing Coral Tree** ..... 79  
**Bauhinia** ..... 33, 34  
    *binata* ..... 33  
    *cunninghamii* ..... 34  
**Black Wattle** ..... 8  
**Blue Pea** ..... 57  
**Bossiaea** ..... 51  
    *bossiaeioides* ..... 51, 54  
    *Brachysema uniflorum* ..... 91, 94  
**Breynia** ..... 208

|                                              |          |                                                     |            |
|----------------------------------------------|----------|-----------------------------------------------------|------------|
| cernua .....                                 | 208, 211 | <b>Centrosema</b> .....                             | 56         |
| rhynchocarpa .....                           | 209      | plumieri .....                                      | 56, 59     |
| stipitata .....                              | 209      | pubescens .....                                     | 56, 59     |
| <i>Bridelia</i> .....                        | 209      | <b>Cerriops</b> .....                               | 186        |
| <b>Briedelia</b> .....                       | 209      | australis .....                                     | 186, 187   |
| tomentosa .....                              | 209, 211 | decandra .....                                      | 186, 187   |
| <b>Bruguiera</b> .....                       | 183      | tagal .....                                         | 186, 187   |
| exaristata .....                             | 184, 185 | tagal var. <i>australis</i> .....                   | 186        |
| gymnorrhiza .....                            | 184, 185 | <b>Chamaecrista</b> .....                           | 30         |
| parviflora .....                             | 184, 185 | absus .....                                         | 29, 31     |
| Buffalo Clover .....                         | 50       | <i>lechenaultiana</i> .....                         | 31         |
| <i>Burtonia subulata</i> .....               | 84       | mimosoides .....                                    | 29, 31, 32 |
| <b>Caesalpinia</b> .....                     | 30       | nictitans .....                                     | 29, 31     |
| bonduc .....                                 | 29, 30   | nigricans .....                                     | 32         |
| CAESALPINIACEAE .....                        | 28       | rotundifolia .....                                  | 29, 31     |
| <b>Cajanus</b> .....                         | 51       | sp. ....                                            | 29, 32     |
| acutifolius .....                            | 52, 54   | Chamaesyce .....                                    | 215        |
| cajan .....                                  | 51       | <i>hirta</i> .....                                  | 217        |
| grandifolius .....                           | 52       | <i>vachellii</i> .....                              | 219        |
| marmoratus .....                             | 52, 54   | <b>Choriceras</b> .....                             | 209        |
| reticulatus var. <i>grandifolius</i> .....   | 52, 54   | tricorne .....                                      | 209, 211   |
| scarabaeoides var. <i>pedunculatus</i> ..... | 53, 54   | <b>Christia</b> .....                               | 56         |
| Calopo .....                                 | 53       | australasica .....                                  | 56, 59     |
| <b>Calopogonium</b> .....                    | 53       | <b>Claoxylon</b> .....                              | 210        |
| mucunoides .....                             | 53, 54   | tenerifolium .....                                  | 210, 211   |
| <b>Calytrix</b> .....                        | 152      | <i>Cleistocalyx operculatus</i> .....               | 179        |
| achaeta .....                                | 152, 153 | <b>Clitoria</b> .....                               | 57         |
| arborescens .....                            | 153, 153 | australis .....                                     | 57, 59     |
| <i>brachychaeta</i> .....                    | 153      | ternatea .....                                      | 57, 59     |
| brownii .....                                | 153, 153 | Codiaeum .....                                      | 206, 210   |
| exstipulata .....                            | 153, 154 | Coffee Bush .....                                   | 25         |
| <i>microphylla</i> .....                     | 154      | COMBRETACEAE .....                                  | 142        |
| <b>Canavalia</b> .....                       | 53       | <b>Crotalaria</b> .....                             | 58         |
| cathartica .....                             | 55, 59   | alata .....                                         | 58, 59     |
| gladiata .....                               | 55       | brevis .....                                        | 59, 60     |
| <i>maritima</i> .....                        | 55       | calycina .....                                      | 60, 63     |
| papuana .....                                | 55, 59   | crassipes .....                                     | 61         |
| rosea .....                                  | 55, 59   | goreensis .....                                     | 60, 63     |
| Candlebush .....                             | 37       | <i>linifolia</i> .....                              | 60, 61     |
| <b>Cansjera</b> .....                        | 191      | medicaginea .....                                   | 58, 60, 63 |
| leptostachya .....                           | 191, 191 | montana .....                                       | 60, 61, 63 |
| <b>Carallia</b> .....                        | 184      | novae-hollandiae .....                              | 58, 61, 63 |
| brachiata .....                              | 185, 186 | novae-hollandiae subsp. <i>lasiophylla</i> .....    | 61         |
| <b>Cassia</b> .....                          | 30       | novae-hollandiae subsp. <i>novae-hollandiae</i> ... | 61         |
| absus .....                                  | 31       | pallida .....                                       | 58, 61, 63 |
| alata .....                                  | 37       | quinquefolia .....                                  | 61, 63     |
| fistula .....                                | 29, 30   | retusa .....                                        | 58, 62, 63 |
| <i>harneyi</i> .....                         | 29, 32   | <i>trifoliatrum</i> .....                           | 60         |
| <i>leptoclada</i> .....                      | 37       | verrucosa .....                                     | 62, 63     |
| mimosoides .....                             | 31       | <b>Croton</b> .....                                 | 210        |
| <i>obtusifolia</i> .....                     | 37       | argyratus .....                                     | 212, 214   |
| <i>occidentalis</i> .....                    | 38       | arnemicus .....                                     | 212, 214   |
| <i>surattensis</i> .....                     | 38       | habrophyllus .....                                  | 212, 214   |
| <i>timoriensis</i> .....                     | 38       | sp. aff. <i>dockrillii</i> .....                    | 212        |
| <b>Cassine</b> .....                         | 202      | tomentellus .....                                   | 212, 214   |
| melanocarpa .....                            | 202, 203 | <b>Cyclocarpa</b> .....                             | 62         |
| <b>Cathormium</b> .....                      | 23       | stellaris .....                                     | 62, 67     |
| umbellatum .....                             | 23, 24   | <b>Dalbergia</b> .....                              | 64         |
| CELASTRACEAE .....                           | 202      | candenatensis .....                                 | 64, 67     |

|                                              |          |                                        |               |
|----------------------------------------------|----------|----------------------------------------|---------------|
| sissoo .....                                 | 64, 67   | <b>Endospermum</b> .....               | 213           |
| Darwin Stringybark .....                     | 168      | medullosum .....                       | 213, 214      |
| <b>Daviesia</b> .....                        | 64       | <b>Entada</b> .....                    | 23            |
| reclinata .....                              | 64, 67   | pursaetha .....                        | 23            |
| <b>Decaisnina</b> .....                      | 198      | rheedii .....                          | 23, 24        |
| brittenii .....                              | 198      | <b>Eriosema</b> .....                  | 78            |
| petiolata .....                              | 198      | chinense .....                         | 78, 81        |
| signata .....                                | 198      | <b>Erythrina</b> .....                 | 78            |
| signata subsp. cardiophylla .....            | 198, 200 | variegata var. <i>orientalis</i> ..... | 78            |
| signata subsp. signata .....                 | 198, 200 | vespertilio .....                      | 78, 81        |
| <b>Delonix</b> .....                         | 32       | <b>Erythrophleum</b> .....             | 32            |
| regia .....                                  | 29, 32   | chlorostachys .....                    | 29, 32        |
| <b>Dendrolobium</b> .....                    | 65       | <b>Eucalyptus</b> .....                | 154           |
| stipatum .....                               | 65, 67   | alba .....                             | 160, 161, 168 |
| 'Green Ant Ck' .....                         | 65, 67   | alba var. <i>australasica</i> .....    | 160           |
| <b>Dendromyza</b> .....                      | 192      | apodophylla .....                      | 160, 161      |
| reinwardtiana .....                          | 192, 193 | bigalerita .....                       | 160, 161      |
| <b>Dendrophthoe</b> .....                    | 198      | bleeseri .....                         | 156, 161, 161 |
| glabrescens .....                            | 198, 200 | brachyandra .....                      | 161, 161      |
| odontocalyx .....                            | 198, 200 | camaldulensis .....                    | 154, 161, 161 |
| <b>Denhamia</b> .....                        | 202      | clavigera .....                        | 156, 162, 164 |
| obscura .....                                | 202, 203 | confertiflora .....                    | 156, 162, 164 |
| <b>Derris</b> .....                          | 66       | darwinensis .....                      | 163           |
| trifoliata .....                             | 66, 67   | dichromophloia .....                   | 156, 162, 164 |
| uliginosa .....                              | 66       | erubescens .....                       | 168           |
| <b>Desmanthus</b> .....                      | 23       | ferruginea .....                       | 156, 162, 164 |
| virgatus .....                               | 23, 24   | foelscheana .....                      | 156, 162, 164 |
| <b>Desmodium</b> .....                       | 66       | gigantangion .....                     | 165           |
| biarticulatum .....                          | 69, 73   | grandifolia .....                      | 156, 163, 164 |
| biarticulatum var. <i>australiense</i> ..... | 69       | herbertiana .....                      | 156, 163, 164 |
| brachypodium .....                           | 69, 73   | jacobsiana .....                       | 156, 163, 164 |
| brownii .....                                | 69, 73   | jensenii .....                         | 156, 163, 164 |
| campylocaulon .....                          | 70, 73   | kakadu .....                           | 163           |
| 'Darwin' .....                               | 74, 77   | kombolgiensis .....                    | 156, 163, 167 |
| filiforme .....                              | 70, 73   | latifolia .....                        | 156, 165, 167 |
| gangeticum .....                             | 70, 73   | miniata .....                          | 154, 165, 167 |
| heterocarpon var. <i>strigosum</i> .....     | 71, 73   | nesophila .....                        | 156, 165, 167 |
| 'Limbunya' .....                             | 75, 77   | oligantha .....                        | 156, 165, 167 |
| 'Melville Is.' .....                         | 75, 77   | papuana .....                          | 156, 165, 167 |
| muelleri .....                               | 71, 73   | patellaris .....                       | 156, 166, 167 |
| 'Pine Ck' .....                              | 75, 77   | phoenicea .....                        | 154, 166, 167 |
| polyneurum .....                             | 71, 73   | polycarpa .....                        | 156, 166, 169 |
| pulchellum .....                             | 72, 77   | porrecta .....                         | 156, 166, 169 |
| scorpiurus .....                             | 72, 77   | ptychocarpa .....                      | 154, 166, 169 |
| tortuosum .....                              | 72, 77   | setosa .....                           | 156, 168, 169 |
| trichostachyum .....                         | 74, 77   | tectifica .....                        | 156, 168, 171 |
| triflorum .....                              | 74, 77   | tetrodonta .....                       | 154, 168, 171 |
| velutinum .....                              | 74, 77   | tintinnans .....                       | 156, 168, 171 |
| <i>Dicerna biarticulatum</i> .....           | 69       | umbrawarenensis .....                  | 156, 168, 171 |
| <b>Diplatia</b> .....                        | 200      | <i>Eugenia angophoroides</i> .....     | 177           |
| furcata .....                                | 200, 200 | armstrongii .....                      | 177           |
| <b>Drypetes</b> .....                        | 213      | bleeseri .....                         | 178           |
| deplanchei .....                             | 213, 214 | eucalyptoides .....                    | 177           |
| lasiogyna .....                              | 213      | fibrosa .....                          | 178           |
| <b>Dunbaria</b> .....                        | 76       | fortis .....                           | 178           |
| conspersa .....                              | 76       | minutuliflora .....                    | 178           |
| rotundifolia .....                           | 76, 81   | suborbicularis .....                   | 179           |
| singuliflora .....                           | 76, 81   | <b>Euphorbia</b> .....                 | 206, 215      |
| <i>Elaeodendron melanocarpum</i> .....       | 202      | armstrongiana .....                    | 216, 218      |
|                                              |          | atoto .....                            | 216, 218      |



- chamaesyce ..... 216, 218  
 cyathophora ..... 217, 218  
 heterophylla ..... 217, 218  
 hirta ..... 217, 218  
 muelleri ..... 217, 218  
*prostrata* ..... 216  
 schizolepis ..... 218, 219  
 schultzei ..... 218, 219  
*serrulata* ..... 219  
 vachellii ..... 218, 219  
**EUPHORBIACEAE** ..... 206  
**Excoecaria** ..... 219  
 agallocha ..... 220, 222  
 ovalis ..... 220, 222  
 parvifolia ..... 220, 222  
**Exocarpos** ..... 193  
 latifolius ..... 193, 193  
**FABACEAE** ..... 39  
*Fenzlia retusa* ..... 175  
**Flemingia** ..... 79  
 involucrata ..... 79, 81  
 lineata ..... 80, 81  
 macrophylla ..... 82  
 parviflora ..... 80, 85  
 pauciflora ..... 80, 85  
 racemosa ..... 80  
 schultzei ..... 80  
 trifoliatum ..... 82, 85  
 'Rum Jungle' ..... 82  
**Flueggea** ..... 220  
 virosa subsp. *melanthesoides* ..... 220, 222  
**Galactia** ..... 82  
 megalophylla ..... 83, 85  
 muelleri ..... 83, 85  
 tenuiflora ..... 83, 85  
 'Litchfield' ..... 83, 85  
 Ghost Gum ..... 166  
**Glochidion** ..... 221  
 apodogynum ..... 223  
 disparipes ..... 223  
 perakense var. *supra-axillare* ..... 221, 222  
 xerocarpum ..... 221, 222  
**Glycine** ..... 83  
 hirticaulis ..... 84, 85  
 tomentella ..... 84, 85  
 Golden Rain Tree ..... 30  
 Golden Shower ..... 30  
**Gompholobium** ..... 84  
 subulatum ..... 84, 85  
**Gonocarpus** ..... 128  
 chinensis subsp. *chinensis* ..... 129, 129  
 chinensis subsp. *verrucosus* ..... 129  
 leptothecus ..... 129, 129  
 Green Plum ..... 147  
**Grevillea** ..... 119  
 angulata ..... 120, 121  
 aurea ..... 120  
 benthamiana ..... 121, 122  
 brevis ..... 120  
 decurrens ..... 119, 121, 122  
 dimidiata ..... 119, 121, 122  
 dryandri ..... 118  
 dryandri subsp. *dasycarpa* ..... 121, 122  
 dryandri subsp. *dryandri* ..... 118, 119, 122  
 erythroclada ..... 125  
 formosa ..... 121, 122  
 goodii subsp. *goodii* ..... 123  
 goodii subsp. *pluricaulis* ..... 121, 123  
 heliosperma ..... 119, 121, 123  
 longicuspis ..... 121, 123  
 mimosoides ..... 123, 124  
 myosodes ..... 123, 124  
 parallela ..... 118, 124, 125  
 pteridifolia ..... 124, 125  
 pyramidalis ..... 124, 125  
 refracta ..... 124, 125  
 Gutta Percha ..... 220  
**Hakea** ..... 126  
 arborescens ..... 124, 126  
**HALORAGACEAE** ..... 128  
**Helicia** ..... 126  
 australasica ..... 124, 126  
 Hevea brasiliensis ..... 206  
**HIPPOCRATEACEAE** ..... 204  
*Homalanthus* ..... 228  
**Ilex** ..... 205  
 arnhemensis ..... 205, 205  
 Indian Almond ..... 147  
**Indigofera** ..... 86  
 colutea ..... 87, 90  
 glandulosa ..... 87, 87  
 hirsuta ..... 87, 90  
 linifolia ..... 87, 90  
 parviflora ..... 88, 90  
 polygaloides ..... 88  
 saxicola ..... 88, 90  
 schultzeana ..... 89, 90  
 tinctoria ..... 89, 90  
 trifoliata ..... 89, 90  
 trita subsp. *trita* ..... 89, 90  
 viscosa ..... 87  
 Ironbark ..... 163  
 Ironwood ..... 33  
**Jacksonia** ..... 91  
 dilatata ..... 91, 94  
**Jatropha** ..... 206, 223  
 curcas ..... 222, 223  
 gossypifolia ..... 222, 223  
 multifida ..... 223  
 podagrica ..... 223  
 Kakadu Plum ..... 147  
**Leptopus** ..... 223  
 decaisnei ..... 223, 227

|                                                        |               |
|--------------------------------------------------------|---------------|
| <b>Leptosema</b> .....                                 | 91            |
| sp. ....                                               | 91, 94        |
| <b>Leptospermum</b> .....                              | 170           |
| <i>longifolium</i> .....                               | 170           |
| <i>madidum</i> subsp. <i>sativum</i> .....             | 170, 171      |
| <i>parviflorum</i> .....                               | 170           |
| <b>Leucaena</b> .....                                  | 25            |
| <i>leucocephala</i> .....                              | 25, 26        |
| <b>Lophostemon</b> .....                               | 170           |
| <i>grandiflorus</i> .....                              | 170, 171      |
| <i>lactifluus</i> .....                                | 170, 171      |
| <b>LORANTHACEAE</b> .....                              | 194           |
| <b>Ludwigia</b> .....                                  | 137           |
| <i>adscendens</i> .....                                | 138, 139      |
| <i>hyssopifolia</i> .....                              | 138, 139      |
| <i>octovalvis</i> .....                                | 138, 139      |
| <i>perennis</i> .....                                  | 138, 139      |
| <b>Lumnitzera</b> .....                                | 142           |
| <i>littorea</i> .....                                  | 142, 146      |
| <i>racemosa</i> .....                                  | 142, 146      |
| <b>Lysiphyllum</b> .....                               | 33            |
| <i>binatum</i> .....                                   | 33, 35        |
| <i>cunninghamii</i> .....                              | 34, 35        |
| <b>LYTHRACEAE</b> .....                                | 132           |
| <b>Macaranga</b> .....                                 | 224           |
| <i>involucrata</i> var. <i>mallotoides</i> .....       | 224, 227      |
| <i>tanarius</i> .....                                  | 224, 227      |
| <b>Macroptilium</b> .....                              | 91            |
| <i>atropurpureum</i> .....                             | 92, 94        |
| <i>lathyroides</i> .....                               | 92, 94        |
| <b>Mallotus</b> .....                                  | 225           |
| <i>didymochryseus</i> .....                            | 225, 227      |
| <i>nesophilus</i> .....                                | 225, 227      |
| <i>philippensis</i> .....                              | 225, 227      |
| <i>Manihot</i> <i>esculenta</i> .....                  | 206           |
| <b>Margaritaria</b> .....                              | 226           |
| <i>dubium-traceyi</i> .....                            | 226, 227      |
| <i>indica</i> .....                                    | 226           |
| <b>Matchbox Bean</b> .....                             | 25            |
| <b>Maughania</b> ("Moghania") <i>involucrata</i> ..... | 79            |
| ("Moghania") <i>lineata</i> .....                      | 80            |
| ("Moghania") <i>parviflora</i> .....                   | 80            |
| ("Moghania") <i>pauciflora</i> .....                   | 80            |
| ("Moghania") <i>trifoliastrum</i> .....                | 82            |
| <b>Maytenus</b> .....                                  | 203           |
| <i>ferdinandi</i> .....                                | 203, 203      |
| <b>Melaleuca</b> .....                                 | 171           |
| <i>acacioides</i> .....                                | 172, 174      |
| <i>argentea</i> .....                                  | 173, 174      |
| <i>cajuputi</i> .....                                  | 172, 173, 174 |
| <i>dealbata</i> .....                                  | 173, 174      |
| <i>leucadendra</i> .....                               | 172, 173, 174 |
| <i>nervosa</i> .....                                   | 173, 174      |
| <i>symphyocarpa</i> .....                              | 152           |
| <i>viridiflora</i> .....                               | 174, 174      |
| <b>Melastoma</b> .....                                 | 140           |
| <i>affine</i> .....                                    | 140, 141      |
| <b>MELASTOMATACEAE</b> .....                           | 140           |
| <b>Melville Island Bloodwood</b> .....                 | 165           |
| <b>Memecylon</b> .....                                 | 140           |
| <i>pauciflorum</i> .....                               | 140, 141      |
| <b>Metrosideros</b> <i>eucalyptoides</i> .....         | 181           |
| <i>tetrapetala</i> .....                               | 183           |
| <b>Micrococca</b> .....                                | 226           |
| <i>mercurialis</i> .....                               | 226, 227      |
| <b>Milky Plum</b> .....                                | 126           |
| <b>Mimosa</b> .....                                    | 25            |
| <i>pigra</i> .....                                     | 25, 26        |
| <i>pudica</i> .....                                    | 26, 27        |
| <b>Mistletoe</b> .....                                 | 195, 201      |
| <b>MIMOSACEAE</b> .....                                | 1             |
| <b>Mucuna</b> .....                                    | 92            |
| <i>gigantea</i> .....                                  | 92, 94        |
| <i>reptans</i> .....                                   | 93, 94        |
| <b>Myriophyllum</b> .....                              | 129           |
| <i>muricatum</i> .....                                 | 130, 130      |
| <i>trachycarpum</i> .....                              | 130, 130      |
| <i>tuberculatum</i> .....                              | 130           |
| <b>MYRTACEAE</b> .....                                 | 150           |
| <b>Myrtella</b> .....                                  | 175           |
| <i>phebaloides</i> .....                               | 175           |
| <i>retusa</i> .....                                    | 175, 180      |
| <b>Neptunia</b> .....                                  | 27            |
| 'Darwin' .....                                         | 26, 27        |
| <i>major</i> .....                                     | 26, 27        |
| <b>Nesaea</b> .....                                    | 133           |
| <i>striatiflora</i> .....                              | 133, 134      |
| <b>OLACACEAE</b> .....                                 | 189           |
| <b>Olax</b> .....                                      | 189           |
| <i>imbricata</i> .....                                 | 189, 190      |
| <b>Omalanthus</b> .....                                | 228           |
| <i>novo-guineensis</i> .....                           | 222, 228      |
| <b>ONAGRACEAE</b> .....                                | 137           |
| <b>Opilia</b> .....                                    | 191           |
| <i>amentacea</i> .....                                 | 191, 191      |
| <b>OPILIACEAE</b> .....                                | 190           |
| <b>Orange Flame Tree</b> .....                         | 32            |
| <b>Osbeckia</b> .....                                  | 141           |
| <i>australiana</i> .....                               | 141, 141      |
| <b>Osbornia</b> .....                                  | 175           |
| <i>octodonta</i> .....                                 | 175, 180      |
| <b>Paperbarks</b> .....                                | 171           |
| <b>Parkinsonia</b> .....                               | 34            |
| <b>Parkinsonia</b> .....                               | 34            |
| <i>aculeata</i> .....                                  | 34, 35        |
| <b>Peltophorum</b> .....                               | 34            |
| <b>Peltophorum</b> .....                               | 36            |
| <b>Peltophorum</b> <i>pterocarpum</i> .....            | 34, 35        |
| <b>Pemphis</b> .....                                   | 133           |
| <i>acidula</i> .....                                   | 133, 134      |
| <b>Persoonia</b> .....                                 | 126           |
| <i>falcata</i> .....                                   | 124, 126      |
| <b>Petalostigma</b> .....                              | 228           |
| <i>banksii</i> .....                                   | 227, 229      |
| <i>pubescens</i> .....                                 | 229           |
| <i>quadriloculare</i> .....                            | 227, 229      |

|                                               |          |                                           |          |
|-----------------------------------------------|----------|-------------------------------------------|----------|
| <b>Phaleria</b> .....                         | 136      | <i>australis</i> .....                    | 176, 180 |
| <i>octandra</i> .....                         | 136, 136 | <b>Rhynchosia</b> .....                   | 96       |
| Phasey Bean .....                             | 92       | <i>acutifolia</i> .....                   | 52       |
| <b>Phyllanthus</b> .....                      | 229      | <i>australis</i> .....                    | 96, 99   |
| <i>acidus</i> .....                           | 229      | <i>minima</i> .....                       | 97, 99   |
| <i>amarus</i> .....                           | 230, 232 | <i>minima</i> var. <i>australis</i> ..... | 97       |
| <i>carpentariae</i> .....                     | 231      | <i>minima</i> var. <i>eurycarpa</i> ..... | 97       |
| <i>ciccoides</i> .....                        | 231      | <i>Ricinus communis</i> .....             | 206      |
| <i>ciccoides</i> var. <i>puberulous</i> ..... | 231      | River Red Gum .....                       | 162      |
| <i>distichus</i> .....                        | 229      | <b>Rotala</b> .....                       | 135      |
| <i>ditassoides</i> .....                      | 234      | <i>diandra</i> .....                      | 134, 135 |
| <i>emblica</i> .....                          | 229      | <i>mexicana</i> .....                     | 134, 135 |
| <i>flagellaris</i> .....                      | 230, 232 | <i>occultiflora</i> .....                 | 134, 135 |
| <i>glaucus</i> .....                          | 235      | <i>rosea</i> .....                        | 134, 135 |
| <i>grandisepalus</i> .....                    | 230, 232 | <b>Salacia</b> .....                      | 204      |
| <i>leai</i> .....                             | 231, 232 | <i>chinensis</i> .....                    | 204, 205 |
| <i>maderaspatensis</i> .....                  | 231, 232 | Salty Plum .....                          | 147      |
| <i>minutiflorus</i> .....                     | 231, 232 | Sandlewood .....                          | 194      |
| <i>ochrophyllus</i> .....                     | 235      | SANTALACEAE .....                         | 192      |
| <i>reticulatus</i> .....                      | 231, 232 | <b>Santalum</b> .....                     | 193      |
| sp. aff. <i>virgatus</i> .....                | 233, 233 | <i>album</i> .....                        | 194, 194 |
| <i>trachygyna</i> .....                       | 232, 233 | <i>lanceolatum</i> .....                  | 194, 194 |
| <i>urinaria</i> .....                         | 232, 233 | <b>Sauropus</b> .....                     | 234      |
| <i>virgatus</i> .....                         | 233      | <i>ditassoides</i> .....                  | 234, 236 |
| 'Golden Sands' .....                          | 233, 233 | <i>glaucus</i> .....                      | 235, 236 |
| <i>Phyllodium pulchellum</i> .....            | 72       | <i>ochrophyllus</i> .....                 | 235, 236 |
| <b>Piliostigma</b> .....                      | 36       | 'Darwin' .....                            | 235, 236 |
| <i>malabaricum</i> .....                      | 35, 36   | 'Melville Island' .....                   | 235, 236 |
| Pimelea .....                                 | 137      | 'Tiwi' .....                              | 236, 237 |
| <i>punicea</i> .....                          | 137      | <b>Sebastiania</b> .....                  | 237      |
| Poinciana .....                               | 32       | <i>chamaelea</i> .....                    | 236, 237 |
| <i>Poinciana regia</i> .....                  | 32       | <i>Securinega melanthesoides</i> .....    | 220      |
| Poinsettia .....                              | 215      | <b>Senna</b> .....                        | 36       |
| <b>Pongamia</b> .....                         | 93       | <i>alata</i> .....                        | 35, 37   |
| <i>pinnata</i> .....                          | 93, 94   | <i>leptoclada</i> .....                   | 35, 37   |
| <b>Poranthera</b> .....                       | 234      | <i>obtusifolia</i> .....                  | 35, 37   |
| <i>microphylla</i> .....                      | 234, 235 | <i>occidentalis</i> .....                 | 35, 38   |
| PROTEACEAE .....                              | 118      | <i>procumbens</i> .....                   | 35, 38   |
| <b>Psoralea</b> .....                         | 95       | <i>surattensis</i> .....                  | 35, 38   |
| <i>badocana</i> .....                         | 95, 99   | <i>timoriensis</i> .....                  | 35, 38   |
| <i>cinerea</i> .....                          | 95, 99   | <i>tora</i> .....                         | 38       |
| Pycnonia .....                                | 126      | <b>Sesbania</b> .....                     | 97       |
| <b>Pycnospora</b> .....                       | 96       | <i>cannabina</i> .....                    | 98, 99   |
| <i>lutescens</i> .....                        | 96, 99   | <i>erubescens</i> .....                   | 98, 99   |
| Quinine Tree .....                            | 229      | <i>formosa</i> .....                      | 98, 99   |
| <b>Quisqualis</b> .....                       | 143      | <i>grandiflora</i> .....                  | 97, 98   |
| <i>indica</i> .....                           | 143, 146 | <i>sesban</i> .....                       | 98, 99   |
| Racosperma .....                              | 2        | Siratro .....                             | 92       |
| Rangoon Creeper .....                         | 143      | <b>Smithia</b> .....                      | 98       |
| Rattle Pods .....                             | 58       | <i>conferta</i> .....                     | 98, 103  |
| Red Bead Tree .....                           | 22       | <b>Sonneratia</b> .....                   | 131      |
| Red Bush Apple .....                          | 179      | <i>alba</i> .....                         | 131, 131 |
| <b>Rhizophora</b> .....                       | 188      | <i>caseolaris</i> .....                   | 132      |
| <i>apiculata</i> .....                        | 187, 188 | <i>lanceolata</i> .....                   | 131, 132 |
| <i>lamarckii</i> .....                        | 187, 188 | SONNERATIACEAE .....                      | 131      |
| <i>stylosa</i> .....                          | 187, 189 | <b>Sophora</b> .....                      | 100      |
| RHIZOPHORACEAE .....                          | 183      | <i>longipes</i> .....                     | 100, 103 |
| <b>Rhodamnia</b> .....                        | 175      | <i>tomentosa</i> .....                    | 100, 103 |
|                                               |          | <b>Stackhousia</b> .....                  | 204      |



- intermedia ..... 204, 205  
 viminea ..... 204  
**STACKHOUSIACEAE** ..... 204  
**Stenocarpus** ..... 127  
   *acacioides* ..... 127, 127  
   *cunninghamii* ..... 127  
   *cunninghamii* ..... 127, 127  
   *salignus* ..... 128  
   'Top End' ..... 127, 128  
 Stylo ..... 101  
**Stylosanthes** ..... 101  
   *guianensis* ..... 101, 103  
   *hamata* ..... 101, 103  
   *humilis* ..... 101, 103  
   *scabra* ..... 102, 103  
   *viscosa* ..... 102, 103  
 Swamp Bloodwood ..... 166  
 Sword Bean ..... 55  
**Syzygium** ..... 176  
   *angophoroides* ..... 177, 180  
   *aqueum* ..... 176  
   *armstrongii* ..... 177, 180  
   *cumini* ..... 176  
   *eucalyptoides* ..... 177  
   *eucalyptoides* subsp. *bleeseri* ..... 176, 178, 180  
   *eucalyptoides* subsp. *eucalyptoides* ..... 178, 180  
   *fibrosum* ..... 178, 180  
   *forte* ..... 178, 180  
   *malaccense* ..... 176  
   *minutiflorum* ..... 178, 180  
   *nervosum* ..... 179, 180  
   *operculatum* ..... 179  
   *suborbiculare* ..... 176, 179, 180  
  
 Tamarind ..... 39  
**Tamarindus** ..... 39  
   *indica* ..... 35, 39  
**Templetonia** ..... 102  
   *hookeri* ..... 102, 103  
**Tephrosia** ..... 102  
   *brachyodon* var. *longifolia* ..... 105, 108  
   *coriacea* ..... 105, 108  
   *filipes* ..... 105, 108  
   *graminifolia* ..... 109  
   'Hayes Ck' ..... 110, 111  
   *juncea* ..... 106, 108  
   'Katherine Gorge' ..... 110, 111  
   *lamproloboides* ..... 106, 108  
   *nematophylla* ..... 106, 108  
   *oblongata* ..... 106, 108  
   *phaeosperma* ..... 107, 108  
   *polyzyga* ..... 107, 111  
   *porrecta* ..... 107, 111  
   *purpurea* var. *axillaris* ..... 109  
   *purpurea* var. *longifolia* ..... 105  
   *remotiflora* ..... 109, 111  
   *savannicola* ..... 110  
   *simplicifolia* ..... 109, 111  
   *singuliflora* ..... 107  
   *spechtii* ..... 109, 111  
   *subnuda* ..... 109  
   *subpectinata* ..... 110, 111  
   'Hayes Ck' ..... 110, 111  
   'Katherine Gorge' ..... 110, 111  
**Terminalia** ..... 143  
   *bursarina* ..... 145  
   *canescens* ..... 145, 146  
   *carpentariae* ..... 145, 146  
   *catappa* ..... 145, 146  
   *erythrocarpa* ..... 146, 147  
   *ferdinandiana* ..... 147, 149  
   *fitzgeraldii* ..... 147, 149  
   *grandiflora* ..... 147, 149  
   *hadleyana* subsp. *carpentariae* ..... 145  
   *latipes* ..... 147, 149  
   *latipes* subsp. *psilocarpa* ..... 147  
   *microcarpa* ..... 148, 149  
   *oblongata* subsp. *volucris* ..... 148  
   *platyphylla* ..... 148, 149  
   *platyptera* ..... 148, 149  
   *prostrata* ..... 147  
   *pterocarya* ..... 148, 149  
   *sericocarpa* ..... 148  
   *volucris* ..... 148, 149  
**Thecanthes** ..... 137  
   *punicea* ..... 136, 137  
**THYMELAEACEAE** ..... 136  
 Townsville Stylo ..... 101  
*Tristania grandiflora* ..... 170  
   *lactiflua* ..... 170  
   *psidioides* ..... 182  
   *umbrosa* ..... 183  
 Turkey Bush ..... 154  
  
**Uraria** ..... 112  
   *cylindracea* ..... 112  
   *lagopodioides* ..... 112, 115  
   *picta* ..... 112  
   'Litchfield' ..... 112, 115  
  
 Verano ..... 101  
**Verticordia** ..... 179  
   *cunninghamii* ..... 179, 182  
   *decussata* ..... 181, 182  
   *verticillata* ..... 181, 182  
**Vigna** ..... 112  
   *adenantha* ..... 113, 115  
   *canescens* ..... 50  
   *lanceolata* var. *filiformis* ..... 113, 115  
   *mungo* ..... 112  
   *radiata* ..... 112, 113  
   *radiata* var. *sublobata* ..... 113, 115  
   *unguiculata* ..... 112  
   *vexillata* var. *angustifolia* ..... 114, 115  
   *vexillata* var. *vexillata* ..... 114, 115  
**Viscum** ..... 201  
   *articulatum* ..... 201, 201  
   *whitei* subsp. *flexicaule* ..... 201, 201  
**VISCACEAE** ..... 201  
 Weeping Tea Tree ..... 170

|                                      |            |
|--------------------------------------|------------|
| White Bush Apple .....               | 178        |
| Woolly Butt .....                    | 165        |
| <b>Xanthostemon</b> .....            | <b>181</b> |
| eucalyptoides .....                  | 181, 182   |
| paradoxus .....                      | 182, 182   |
| psidioides .....                     | 182, 182   |
| umbrosus .....                       | 182, 183   |
| <b>Ximenia</b> .....                 | <b>189</b> |
| americana .....                      | 190, 190   |
| Yellow Flame Tree .....              | 36         |
| <b>Zornia</b> .....                  | <b>114</b> |
| acuta .....                          | 116, 117   |
| areolata .....                       | 116, 117   |
| chaetophora .....                    | 116, 117   |
| disticha .....                       | 116, 117   |
| muelleriana subsp. muelleriana ..... | 116, 117   |
| oligantha .....                      | 117        |
| prostrata .....                      | 116, 117   |
| 'Darwin Lawns' .....                 | 117, 117   |

CFL LIBRARY SERVICES



LRBM 0015852 8

c.1







